Electrical Review

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Wholesale Opportunity for Retail Electrical Dealer

Equipment of Apartment Houses with Complete Line of Labor-Saving Household Appliances for Each Tenant Presents a Large Fertile Field for Sale and Installation of Electrical Goods

By KATHERYN MADDOCK

More than half the people of the United States live in cities. A large proportion of those that live in cities are dwellers in apartment houses or clubs, apartment hotels or other similar group buildings. In answer to the crying demand for more homes, incident upon the housing shortage, construction of a considerably increased number of apartment houses is planned for the near future. Here is a real market for electrical household appliances.

Of course, no electrical dealer could depend solely on apartment-house owners and builders for his business. Not many dealers could depend upon this field for even any considerable portion of their trade, yet certainly no dealer can afford to overlook it. The apartment house, hotel or clubhouse which is to be equipped with electrical appliances by the owner is a fine opportunity for quantity sales, and it is an opportunity which is developing rapidly.

During the 4 yrs. from 1916 to 1920, years not at all favorable for building operations, 24,266 apartments were built in this country. It was estimated recently that there are now 124 families for every 100 homes, and that it will take the construction of 660,000 homes per year for 5 yrs. to bring the nation back to the housing situation which prevailed before the war. Relief is bound to be afforded in the face of such congestion as this and it is safe to say that a fair portion of the new buildings erected will be apartments and apartment hotels. Brookmire's building reports covering the entire country show a great increase in the apartment-house buildings projected during the closing months of 1920.

One of the chief reasons why people like apartment-house life is that it means easier living. The man of the house doesn't have to fuss with the lawn or the furnace. The housewife has no stairs to climb in the course of her duties and she finds the smaller space easier to care for. She likes the luxury of the service which is afforded in a good apartment house. And by the same token, it pleases her mightily to have the owner furnish electric refrigeration, an electric range, cleaner, grill, toaster and other appliances.

Apartment Building Where Electric Ranges Were Supplied for Each Kitchen at a Cost of Approximately $7000.

A Dozen Typical Devices for Comfort, Economy, Convenience and the Saving of Labor in the Home Electrical.

No home is complete without the many advantages to be derived from the utilization of electric service. There are so many devices available for the lessening of labor and the beautifying of the home that it is impossible to show them all, but brief list will show the great versatility of electricity in the home.

She welcomes the electrically equipped apartment with a sigh of relief after having struggled with the servant problem in a dwelling.

It's human nature to want to live without labor,

Kitchen in "Electric Servantless Apartments," New York City, Where Many Appliances Are Provided.

and the builder of quality apartments makes capital out of that fact. The electrical dealer does well to cultivate his acquaintance.

An example of the de luxe apartment electric is the new building in New York City called "The Electric Servantless Apartments," constructed by the Queensborough Corporation. It is a forerunner, its owners believe, of 800 or 900 similar apartments to be fitted up in Jackson Heights, in the Borough of Queens. The six rooms of a single apartment in this house were provided with 35 different electric appliances besides the lights, when it was opened recently for inspection by the public. Most, if not all of these, are to remain when the apartment is rented. The equipment was assembled by Mrs. Mary Hope Norris and furniture was loaned for the period of exhibition by one of the New York department stores.

Electrical Equipment in "Servantless" Apartment Homes.

The opening of such apartments as these should be of widespread interest for it undoubtedly indicates that landlords are giving serious

Dining Room in Cleveland Merrill System Apartments Equipped by the Landlord.

thought to complete installation of electric household appliances. The "Electric Servantless Apartments" contain the following equipment for convenience and labor saving:

Living Room.—Electric player piano, electric phonograph, table lamps, floor lamps and ceiling lighting fixture.

Dining Room.—Electric percolator, toaster-stove, chafing dish, electric ovenette, waffle iron, grill, egg beater and mixer and ceiling lighting fixture.

Front Bedroom.—Electric heating pad, vibrator, curling iron, electric radiator, bedside lamp and ceiling lighting fixture.

Rear Bedroom.—Electric sewing machine, violet ray outfit, boudoir electric flatiron, electric heater and hair drier.

Nursery.—Baby milk warmer, miniature electric heating pad, toy electric range, electrically heated toy steam engine, electric train, electric boat, electric nursery light and nursery table light.

Kitchen.—Electric range, electric fireless cooker, electric dishwasher, electric cake and dough mixer, electric refrigerator, washing machine, two flatirons, ceiling lighting fixture and electric fan.

This equipment is very similar to that of the first model electric home opened to the public in California last year, except that the nursery of the New York apartments is a distinctive feature.

The Indian Manor Village apartments at Detroit, recently erected at a cost of nearly $4,000,-

Vacuum Cleaning Equipment Provided for Convenience of Tenants.

000, contain an installation of 90 electric ranges which represents an expenditure of $6750. Apartment houses have been a fertile field for electric range and refrigeration sales, but this is now being followed by the more complete installation of household aids. The Indian Manor building is well supplied with these as well.

An interesting Cleveland apartment house is the new building of the Cleveland Merrill System, where disappearing beds and cleverly arranged revolving partitions combine with electric equipment to simplify the task of the housekeeper. When completely furnished by the builder these apartments contain each an electric refrigerator, electric range with cupboards built in about the framework below the burners, electric cleaner, percolator set, grill, toaster and flatiron.

Among the ultra-expensive apartments is one Chicago building, containing suites of from 10 to 20 rooms, which provides a small laundry room for each tenant, with stationary tubs and electric washer, ironer and drier. A refrigerating ma-

chine of 10-ton capacity is installed in the basement of this building and each kitchen contains a refrigerator 10 ft. in length. Inter-phones and annunciators are installed. This is the "3400 Sheridan Road" apartment house—a millionaire's home indeed—but what the millionaires and their "exclusive" friends use is just what everyone else aspires to attain. The electric apartment is fashionable, which makes the equipment a great talking point for the owner, and that is one of the chief reasons why the idea is rapidly spreading.

Then there are the apartment hotels—and here again the management frequently furnishes not only the larger electrical equipment, but also the electric grills, toasters and percolators for table cookery and kitchenette use. An electric ventilating fan is a necessity in the kitchenette. Such

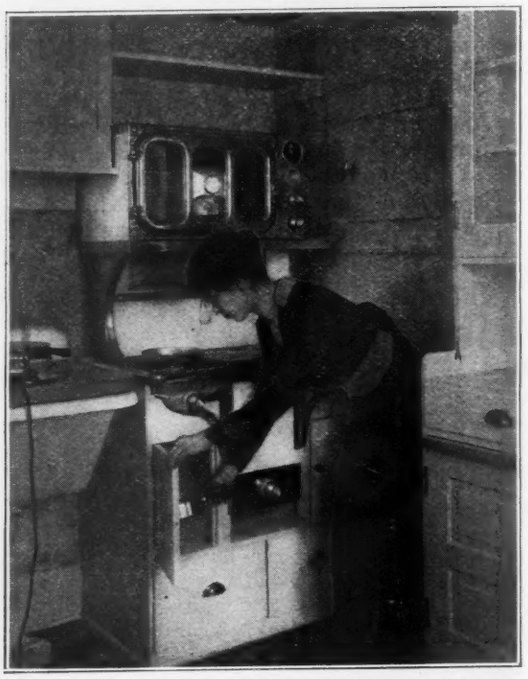


Illustration Showing Space Economy of the Built-In Electric Range.

buildings always contain a hotel laundry which must be electrically equipped.

Hospitals, schools and colleges represent another wholesale field which must not be forgotten. While not so numerous as homes, still when any of these large institutions buy, they sign orders which amount to something. When Yale University purchased "Royal" electric cleaners for the dormitories of the new Harkness Memorial Quadrangle, for instance, the neighborhood dealer delivered not one or two machines, but 48 of them.

The retailer may be a wholesaler every once in so often if he will keep his eye on the new apartment houses and the institutions and see to it that they are equipped with electric servants as well as appropriate and adequate electric illumination.

UTILITIES EXPEND MILLIONS.

The Public Service Commission of Indiana has compiled figures showing that public utilities in that state expended $13,189,530 in 1920 for renewals to their plants and extending their service. The Commission does not claim to be directly responsible for this large program of improvements, but holds that the policies and precedents established by it have fostered the development of the great utilities and allied industries in Indiana.

SOME RECORDS IN CONTINUITY OF SERVICE.

Data Compiled on Schenectady Plant of General Electric Co. Shows That 5% of Employes Have Record Covering Quarter of a Century.

The "Test of Time" of continuity of service, a record that stands for satisfactory plant conditions, is something desired by all industrial concerns. This feature was brought out strongly in a recent contest by a national magazine, asking "Which Is the Best Kept Plant in America?" Hundreds of letters were submitted, among which was one from C. M. Ripley, giving data on the General Electric Co.'s plant at Schenectady, N. Y. The writer showed that of its 23,798 employes, a total of 1050, or nearly 5%, had kept their jobs 25 years or more. Some 20% had held their jobs more than 10 years. Twenty-seven years ago the plant only employed 2500 persons. Thus, these 1050 employes represented 42% of the total working force which existed over a quarter of a century ago.

Many reasons are given in the article for this record. One, however, seems to have an interesting bearing on the longevity of employment. Figures are adduced to show that for last year the time lost due to accidents in this plant was 0.25% of the total working time. In the elimination of accidents the illuminating system at Schenectady is credited with being the big factor. In fact, it was 30 times more dangerous last year to be a fisherman than to work in this plant, surrounded by high-pressure steam and high-voltage electricity, with tons of steel and cast iron constantly dangled over the heads of workmen from the 250 electric cranes and with the thousands of tons of freight packed into cars and carried on the network of railroads in and out of the plant. Against the plant's fatal accident record, of .090 per 1000 employes, compare the United States Department of Labor record which states that four men per 1000 lost their lives by accidents in metal mining, 3.5 in coal mining and three in fisheries, etc.

SCHOLARSHIPS TO BE DISTRIBUTED BY WESTINGHOUSE COMPANY.

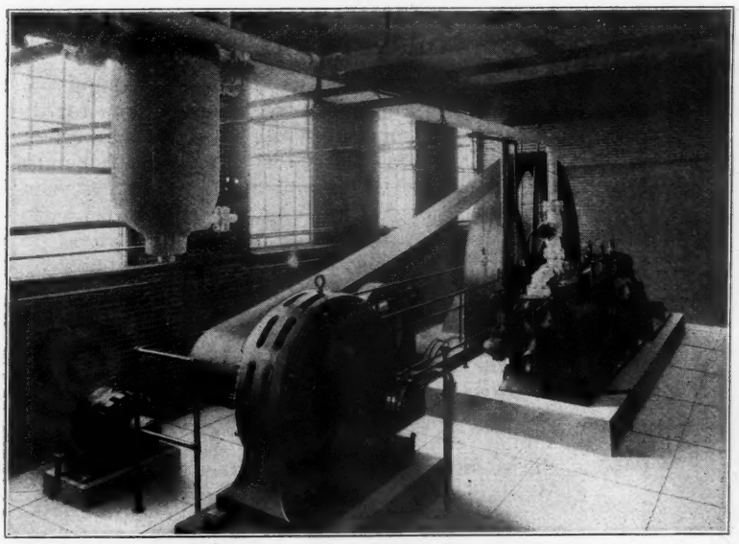
The Westinghouse Electric & Manufacturing Co. has announced the usual four scholarships as a memorial for those in the employ of the company and its subsidiary companies who entered the service of the country during the world war. The scholarships are granted for 1 yr. only, but will be continued for the full course, provided the scholar maintains the academic and other standards required by the college or institution in which he elects to pursue his course of study. These scholarships will be allotted by means of competitive examinations to sons of employes, and employes of the company under special stipulations.

Electrical Refrigeration a Dealer's Opportunity

Ice-Making Machines and Cooling Units for Factory and Home in Great Demand This Year— Motor-Operated Equipment with Automatic Control Assures the Necessary Uniform Temperature

Ice made electrically has increased steadily in tonnage each year, the rate of increase having been rapid, but it would have been much more rapid had not high costs, scarcity of materials and labor and other conditions created by the war acted as deterrents to normal growth. But this year there is every indication that electrically made ice will be in demand far beyond the capacity of all existing plants.

The early arrival of warm weather has already created a market for ice, and a shortage of supplies has resulted in higher prices. Meanwhile ice plants are working full time to produce ice for current demand and for storage. Central stations having ice plants upon their lines are experiencing a prosperous load. In Chicago, alone, three new large plants go into operation this summer; while many more have increased their refrigerating capacity.



Motor-Operated Ice-Making Plant

The ice plant with its high load-factor is a valuable load. The gradual decline of the variable-speed induction motor with its comparatively low efficiency and lower power-factor, likewise that of the constant-speed squirrel-cage induction motor, in favor of the synchronous motor for this particular class of service means a gain of 3 to 6% in efficiency for the ice plant and a gain of anywhere from 40 to 20% in power-factor for the central station. Another advantage of the synchronous motor for this class of service is that its speed characteristics enable it to be direct-connected to the compressor, thus saving floor space as well as such troublesome details as belt slippage and maintenance, variable speed with changing voltage, etc.

The synchronous motor is being employed in practically all recently built ice plants in place of the induction motor. The direct-connected motor without flywheel is the latest word in economical plant lay-out. Recently a 600-hp. motor of this type was placed in service in Chicago—the largest installation of its kind. Today, many central-station ice plants are producing ice on a year-round power consumption as low as 41 kw-hr. per ton of ice, a performance that cannot be approached by a steam-driven plant, without considering the further savings in labor cost.

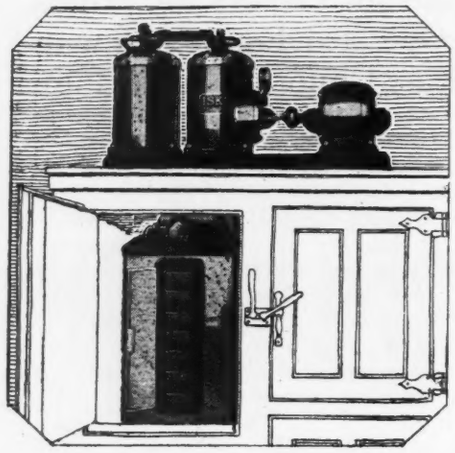
Ice deliveries form the major cost in the ice business, and location of the plant is an important factor in determining the selling price of ice. The electrically operated ice plant with its absence of noise, smell, coal and ash handling can be located in close proximity to the consumer. The rapid increase in the number of ice plants served by central stations is proof that this type of ice plant is the one that pays.

Growing Opportunity for Installation of Domestic Refrigeration.

Somewhat different is the domestic ice plant. But it is one that is finding a great demand this year. Hotels, restaurants and residences find it more and more financially worth while to do their own refrigerating as ice prices rise. The domestic motor-driven refrigerator or ice box, energized by central-station service, will save money for the large ice user and make money for the central-station company supplying it.

Already many public service companies are aggressively pushing the sale of the domestic

refrigerator, some companies having taken over the agency of a particular make of equipment in their territory. The refrigerator appeals to the central station because of the desirable nature of such load, the individual units being small and requiring in most cases no additional line or service costs. That electrical contractors and dealers

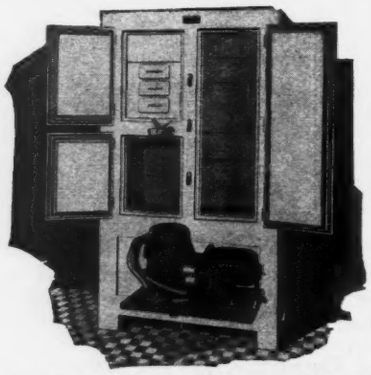


Isko Refrigerating Equipment With Mechanism Mounted on Ice Box.

have an open field for a good refrigerator business seems self evident.

The ELECTRICAL REVIEW hopes to witness the day when every apartment building has its own refrigerating system served from central-station circuits just as it wants to see electric ovens connected up to the same circuits with the washing and ironing machines, the flatirons, fans and vacuum cleaners. It would be only a short step further to adopt air conditioning—another opportunity for the central stations and dealers when there are less pressing matters on hand.

This summer ice plants are to be taxed beyond their capacity; and once again it will be



Frigidaire Ice Box With Equipment Mounted Below Cooling Chambers.

found that few plants have sufficient storage. It is to be hoped that the central stations and the manufacturers of refrigerating machinery will make the most of the opportunity that is theirs.

AUTOMATIC REFRIGERATION EXHIBIT AROUSES GREAT INTEREST.

If attendance is any criterion then the Electric Refrigeration Show, held recently by the New York Edison Co., was most successful. The interest of the public in automatic refrigeration was well exemplified by the large number of persons visiting the showrooms daily, and their keen desire to learn about the operation and advantages of the latest convenience for the home. A dozen different systems were shown in operation, with either ethyl chloride, ammonia or sulphur dioxide as the refrigerant, except the "Frigidaire," made by The Frigidaire Corp., New York City, which uses methyl chloride. A model of the "Carbona" refrigerating and ice machines, made by Esher, Wyss & Co., Switzerland, was exhibited by the American representative, Joseph Roschach, Paterson, N. J., as an example of foreign development.

Exhibits of commercial installations were presented by the Brunswick Refrigerating Co., New Brunswick, N. J.; Shipley Construction & Supply Co., Brooklyn, N. Y., agents for York Mfg. Co., York, Pa., and Fairbanks, Morse & Co., New York City. The following manufacturers demonstrated household models: Audiffren Refrigerating Machine Co., New York City; Balsa Refrigerating Corp., New York City; Clothel Co., New York City; Frigidaire Corp., New York City; The Isko Co., Chicago; Kelvinator Corp., New York City; Norwalk Iron Works, South Norwalk, Conn., and Simplex Refrigerating Corp., Brooklyn, N. Y.

NEW EXAMINATIONS TO BE HELD FOR FEDERAL SERVICE.

The United States Civil Service Commission announces open competitive examinations for the Federal civil service as follows: Junior mechanical engineer, $1500 to $1800 per year; mechanical engineer (internal combustion), $3000 per year; mechanical engineer (designing), $3000 per year; mechanical draftsman (Patent office), $1000 per year; assistant engineer, $1800 to $2340 per year; and junior engineer, $1440 to $1740 per year. Applications must be on file for the first three positions on or before May 24, for the next position on or before May 17, and for the last two positions on or before July 1, 1921. Persons desiring further information in regard to these or similar examinations should communicate with the United States Civil Service Commission, Washington, D. C.

DISCUSS ENGINEERING EDUCATION AT NEW YORK MEETING.

At the joint meeting of the New York section of the American Institute of Electrical Engineers and the Metropolitan section of the American Society of Mechanical Engineers, held in the Engineering Societies building, New York City, April 22, the subject of "The Theoretical Engineer: What Is He? Is There a Place for Him? How Should He Be Trained?" was discussed by Frederic L. Bishop, dean of the School of Engineering, University of Pittsburgh; E. W. Rice, Jr., president of the General Electric Co., and C. R. Dooley, manager of personnel and training, Standard Oil Co. of New Jersey. The meeting was presided over by Comfort A. Adams, chairman of the engineering division, National Research Council.

Educating Architects to Better Home Lighting

External and Internal Policies of Enlightenment Discussed by Leading Fixture Manufacturer — Maintenance of Prices and Betterment of Product—Opportunity for Dealer Co-operation

By C. G. EVERSON
President, C. G. Everson & Co., Chicago.

Manufacturers of lighting fixtures having heretofore never engaged in any co-operative effort to acquaint dealers and users of their products with better and more efficient ways of presenting and using their goods, and the problem being too great a one for the success of individual efforts, the industry has been losing a great opportunity to increase sales and profits. As an industry we have each gone on our individual ways in this respect, each trying to design new things which would "take" with the trade. If one did get up something which "took," all the others would trail along with essentially the same thing until someone else developed something which "took."

In the first place, it has only been by chance that this or that style or type has become the one that "took." What should have been and could be a well ordered plan or campaign of popularizing a better quality, better designed and probably a higher priced type beneficial to the whole industry, is in reality a hit or miss affair resulting generally in permitting cheap and easily assembled fixtures to prevail.

Where Past Methods Have Failed to Benefit the Industry.

Inexpensive fixtures will always be supplied, but the majority of buyers of lighting fixtures would be willing, and are financially able to spend more money for their lighting equipment than they spend now. How often one hears prospec-

View of the Lighting Fixture Display in a Booth at the Recent Own-Your-Own-Home Exposition at the Coliseum, Chicago.

tive buyers of fixtures ask the salesman, "Are these the latest style?" immediately implying thereby that they are open to conviction and persuasion to buy the latest or best. In a case like this it seems to be up to the dealer to bring out his store of fixture knowledge and salesmanship and sell this user—let us call her Mrs. Jones—a better bill of goods, but which most often does not actually happen. In the majority of dealers' stores, outside of those exclusively engaged in selling fixtures, we find a medley of designless creations comprising mostly glass and chain. The fixture manufacturers get nothing from Mrs. Jones' order. She is unknowingly balked at learning what is new and good in fixtures, and in her happy ignorance highly recommends a similar purchase to her friend Mrs. Smith who is also building.

Now, with Mrs. Jones it seemed to be up to Mr. Dealer to make or break a better sale. Mrs. Jones did not insist on this or that style. She wanted guidance. She did not know. But having little demand for better fixtures, what's the use of Mr. Dealer taking a chance and stocking better and higher priced ones. He sold her what cost but little to carry in stock.

Now comes Mrs. Smith, disregarding her friend's advice as to style, for she has ideas of her own. Let us assume she goes to a dealer who does have a stock of "better fixtures" and makes a good selection. She had no idea they cost so much! Why, her architect told her that her fixtures could be bought for $1000 for her house. She has entire confidence in him, and while she has plenty of money she does not intend to be held up. Her architect is right. She should be able to buy for what he said. She will go elsewhere; and does go elsewhere and has three or four rival bids where but one might have been. When she buys she has cut her selection to nearly the architect's estimate, is disappointed in her fixtures and still feels that all the dealers are robbers. Now, we are not ignoring the third possibility, when by superior salesmanship, and having the entire confidence of Mrs. Smith, the dealer does obtain a good order from her. But we are dealing in averages and the first two examples are not at all unusual.

Justification of Educational Campaign Among Architects and Builders.

There is no question but that the fixture manufacturers have failed to acquaint the architect and the user of lighting equipment with the best side of their wares. And the architect, wielding as great an influence as he does in all matters pertaining to the new building, is a great source of first impression and guidance to the fixture user.

There is no question but that lighting equipment plays as important a role in the home as does good furniture, rugs, drapes, etc. Heretofore they have been considered as a part of the house rather than as a part of the home and, hence, have fallen prey to the architect's and contractor's pruning knife to keep costs of building down. They can't do this if the user knows better. The architect won't do this if he realizes differently. Fixture equipment must accord with both house and home.

It is possible for the manufacturers to bring this about. They must make good designs and quality popular by showing what constitutes the difference and what the advantages are of the former. In various steps they could go into the actual details of good construction versus bad construction, good finishes versus bad finishes, good and dependable service versus poor and unreliable service. They could submit to the buyer and architect illustrations of an accepted vogue in styles or an example of good design versus one of poor design, and thereby in time be in a position to make or break, if they willed, tendencies on the part of the architects or buyers towards approving or purchasing fixtures detrimental to first-class business. They should help the sales talk of the dealer by putting back of his arguments the great power which the printed word has when logically used and coming from a recognized authority, and by the same means pave the way for that dealer who now, because of the lack of demand, does not carry the better goods.

Propaganda work of this kind could be accomplished in many ways. There are so many dealers' organizations coming into being, especially in the larger communities, that a vast deal of direct-by-mail propaganda could be successfully distributed through them. Individual alert dealers specializing in lighting equipment could likewise be the medium of distribution, and direct mailing lists from advertising headquarters to architects and home builders would be additional means of distribution. Manufacturers need by no means shoulder this entire burden of propaganda. The benefit derived by the dealers in increased sales and profits will easily justify their active co-operation, financially and otherwise.

Outlining a General Campaign of Education on Co-operative Plan.

In Chicago, an appropriation out of organization funds was tentatively made to cover advertising. How limited are the results possible out of this meager sum covering the limited area of Chicago as compared to that which the same sum would bring if combined with similar amounts from other dealer organizations, and this all together was laid out to buy skillfully prepared propaganda. In every city and to every user our message is the same, and that makes quantity of copy and printing possible. Equitable means of apportioning the cost and distribution could be arranged between the various classes benefited.

This campaign, while directed to the user and architect, would automatically teach the dealer. He could not fail to grasp and take advantage of the higher aim even more effectively than as though the literature were directed to him only. And in the internal ranks of the manufacturers, how could such work fail to inspire every employe of every one of the members to doing his or her share to make better fixtures the watchword. Set up the standards, start to shoot at them and everybody will help to hit the mark.

I have heard a number of the manufacturers—two or three of them—criticise the policy of admitting the public to the annual fixture market in the evening, thus shortening their selling hours; and that suggestion came from manufacturers whom you would hardly think such a statement would come from. I haven't a doubt but that many prospective builders and probably all the

architects of Buffalo passed through that show, who viewed the fixtures there; and no doubt those beautiful fixtures have inspired the desire on the part of those buyers for better goods. I think that is one of the greatest things we can do in subsequent shows; that is, to admit the public as much of the time as possible.

I would like to see some advantage taken of the opportunity we have of notifying the public and the architects—that is, mailing to the architects all over the country letters of recommendation from local architects who have visited the show—and in that way, at very little cost, we would cash in on such benefits as we secured in Buffalo.

COMMENTS ON MR. EVERSON'S ARTICLE BY OTHER MANUFACTURERS.

The following comments of other fixture manufacturers on Mr. Everson's article add weight to various phases of the subject:

M. D. Blitzer, Lightolier Co., New York City.—"In connection with Mr. Everson's article I would like to point out what appears to me to be a very practical suggestion in carrying out some of his ideas. Right now, with business conditions as they are, there will be a continuous competitive effort to get business. Up to very recently that competitive effort has been mainly directed on a price basis. I think if each manufacturer would take those fixtures which he sold at $12, and which he is now selling at less, and would make a distinct effort to keep the price at $12 and to supply a better fixture, we would have an opportunity at this time that is not very apt to come again in a hurry. We have the dealers accustomed to paying certain prices for certain types of fixtures. If we get on a competitive basis and make merchandise from the price point of view only, and let that slide down from $8 to $9, and in many instances to $7, it will be a mistake. But if we make a great effort to put out better lighting fixtures along the lines suggested by Mr. Everson, we will not have very much resistance at this time and we may have an opportunity to realize his actual suggestion of selling better and finer lighting fixtures. It is surprising to note how fast dealers are able to sell higher priced fixtures as soon as they are in possession of the selling points on them."

Charles E. Verhunce, R. Williamson Co., Chicago.—"Despite the reduction in prices of commodities in certain standard lines I do not think the lighting fixture is strictly an article of necessity; I think it is an article, rather, of refinement. I think our product comes in the class of pictures, rugs and furniture, where it is not a question of price but of education, and we are well founded if we talk the policy of offering a product better in quality and better in style. Then let us take some of the money that enters into the cost of these fixtures and appropriate a certain percentage of it to telling the public what we have to offer. This may be a radical suggestion but I believe if all of us follow that policy before we begin to reduce prices and make inferior goods it would prove a wise move. We might better determine our cost of manufacture, then to that cost add a fair proportion—as other progressive lines are doing—to be used for advertising."

Albert Wahle, Wahle & Francois Co., New York City.—"We should begin our education and our propaganda in our own organization and transmit that into the selling of our products. When a salesman has sold a bill of goods, he has sold himself and not the goods. When a salesman has successfully sold goods he has created in the minds of his customers confidence in nearly every case, and the sale of good fixtures is like the sale of any other product. There will always be, as long as the world lasts, classifications in everything. You will always have cheap rugs, cheap pictures and cheap other things to fit the various requirements of life. But it is up to the salesman to take each opportunity, whether it be in farmhouse or mansion to create in the minds of his prospective customers the idea of better fixtures."

Mr. Wahle relates an incident to illustrate the opportunity of salesmen for influencing customers toward appropriate fixtures. Two ladies came to Mr. Wahle's booth at the Buffalo Fixture Market and asked the price of a certain fixture. He inquired if they were in the market to buy a fixture. One of the ladies said she was. He told her he was not selling those particular fixtures. She insisted on knowing the cost, however, and Mr. Wahle told her it was $125.

"I can get one in another booth here for $35," said the woman. Mr. Wahle then asked her where she was going to use it and she told him in the dining room. He then asked her if she would mind telling him how much she had paid for her dining-room furniture and how much for her rug. She replied that she paid $500 for her furniture and $290 for the rug.

"Why do you put in a $35 fixture with furniture and a rug that cost so much," inquired Mr. Wahle. The woman had not thought of it from that angle—an angle to which other salesmen may well call attention.

DANUBE RIVER TO SUPPLY POWER IN AUSTRIA.

The Danube is to be turned into "white coal," the expressive name which has been given to water power. This is as it should be; all Central Europe is prostrate, and water power will serve to rehabilitate it without the use of irreplaceable natural resources such as coal and oil fuel. Wasteful war has compelled the receivership of peace to put to labor all that mighty force contained in the scientific manipulation of the river preëminent in musical romance.

An engineer giving attention to the proposition to develop this stream is said to have stated that there is enough power going to waste at the Iron Gates of the Danube to light all of Central Europe, to operate great manufacturing plants and to run trolley lines and other public utilities. There is a clear field there, it is his belief, waiting for those interested in water-power construction. Electricity could be supplied through several countries by the use of this vast wasted force.

The Austrian Government has practically decided upon a 1,000,000-hp. plant above Vienna, on the Danube. Ten other hydroelectric stations are to be built in the mountains, so that all Austria will some day have an abundance of cheap current for heating, lighting and power purposes.

MACHINE TOOLS AND MOTOR DRIVE IN IMPLEMENT FACTORY.

Vast Amount of Electrical Construction Work Required to Equip Modern Factory and Install Power and Lighting Devices.

By W. A. Scott.

In equipping new shops and factories for motor drive the opportunity is given for installation designs which are most advantageous and adaptable to the machine tools required for the work to be performed. This is especially true when the installations are made in new buildings that have been planned and constructed for some particular line of shop work or manufacturing. Installing machines and motors in such buildings relieves the management of the many disadvantages experienced in turning a warehouse or market building, for instance, into a factory for which modern equipment is required. Modern structures for industrial plants make possible the grouping of special classes of work into departments, the routing of material for the required processes, the proper distribution of power, and provision for adequate lighting, both natural and artificial.

These comments were inspired by a visit to the moderate-sized new farm-implement factory of the Killefer Manufacturing Co., at Los Angeles. Here are five steel-and-brick structures, occupied severally as powerhouse, machine shop, forge and furnace department, assembling room, stock and shipping department; also, a 2-story office building of concrete.

Equipment in Powerhouse of Implement Manufacturing Plant.

The powerhouse contains, in one part, two Westinghouse 100-kv-a. transformers by which energy from the Southern California Edison lines is received at 16,500 volts and stepped down to 440 volts for motor drive. In another compartment is an Ingersoll-Rand compressor of the capacity of 500 cu. ft. of free air per min., belt-driven from a 70-hp. U. S. Electrical Manufacturing Co. alternating-current motor. This unit supplies compressed air for riveters, drills and other tools. In the same room is a Root blower, driven by a 15-hp. motor, supplying the requisite draft for the forges and furnaces.

All of the 70 motors in the plant were furnished and installed by the U. S. Electrical Manufacturing Co., of Los Angeles, Cal. The class of shop work performed here does not require heavy machine tools, and the motors employed are of 2-hp., 3-hp. and 5-hp. capacity. In the machine shop, which is equipped with lathes, drill presses, milling and shaping machines, planers and emery grinders, all motor power is transmitted to the machine tools by Whitney silent-chains. Another feature consists of push-button starting and stopping devices and magnetic control switches which meet the California requirements as to under-voltage and overload protection. In one particular installation there is a 2-speed motor driving a milling and routing machine. By means of a double-throw switch the speed may be changed from 500 to 1000 r.p.m., or vice versa.

For the numerous punches, shears and bolt-cutters in the assembling room the motors are mounted upon the machine stands, and their power is transmitted through reduction gears.

In the large blacksmith shop and furnace room there are eight forges and 10 oil furnaces for heating iron and steel for the power hammers and shapers. Each of the six power hammers is set upon a cast-iron base, the latter resting upon a concrete block 3 ft. thick. The oil feed for forges and heating furnaces is supplied by direct pressure from a motor-driven pump installed outside the building and just above an underground storage tank.

Developed plans contemplate the construction of an iron and steel warehouse and the installation of an electric bridge crane to be operated along a 400-ft. runway between two groups of buildings. This crane will serve all the buildings and this service will be supplemented by monorail systems for several of the departments.

PLACE FOREIGN ENGINEERING STANDARDS ON FILE.

Copies of a large number of engineering standards issued in 1920 by foreign national standardizing bodies have been placed on file with the American Engineering Standards committee, 29 West 39th street, New York. These standards include the British specifications on rolled steel structural sections and for notched bar test pieces; the Canadian standard specification for steel railway bridges; the Belgian specifications for bridge, structural and tank work, for shafts and transmission pulleys and for the use of corrugated galvanized steel as coverings and partitions; miscellaneous Dutch, German, Swiss and Swedish specifications.

The American Engineering Standards committee now is considering certain tentative American standards proposed by the bureau of mines. These include specifications for portable electric mine lamps, for storage battery locomotives and for the installation and use of electrical equipment in bituminous coal mines.

It also has had submitted for approval as an American standard, the regulations of the national board of fire underwriters for electric wiring and apparatus.

BILLIONS FOR CONSTRUCTION THIS YEAR.

Early resumption of home building and other forms of construction is assured if contemplated building projects reported by the F. W. Dodge Co. may be taken as a criterion for the coming year.

Reports from this company show that contemplated building projects for the territory north of the Ohio river and east of the Missouri will probably reach the tremendous amount of $4,800,000,000, which under normal conditions would indicate actual construction during 1921 of approximately $3,200,000,000.

The low lumber market now prevailing paves the way for a big reduction in building costs. Thousands upon thousands of homes, so badly needed, will be built under these conditions. This will necessarily call upon thousands of men from all trades for the production of building materials.

Such demands will naturally lead to steady production and universal employment, which in turn will make for better business activity and general prosperity.

Manually Operated Alternating-Current Controllers

Eleventh of a Series of Articles on Principle and Application of Motor-Control Apparatus — Squirrel-Cage and Slip-Ring Motors — Multiple-Lever and Drum-Type Starters Illustrated

By G. J. KIRKGASSER and E. W. SEEGER

Star-Delta Method of Starting Squirrel-Cage Motors.—Another method of reducing the impressed voltage, employed to some extent with small 3-phase squirrel-cage motors, is to connect the three phases in star for starting and then switching over to a delta connection for running. The starter employed is similar to the small oil-immersed drum used for throwing motors across the line, but it so commutates the connections that when the handle is moved to "start" the incoming current passes through two of the phase windings of the motor in series, and later, with the handle in the "run" position, changes the connections of the phase windings so that each gets the full line voltage.

In the star connection, as shown in the Fig. 84, current passes through two phase windings in series, or in other words there are two windings across each phase of the power supply. This

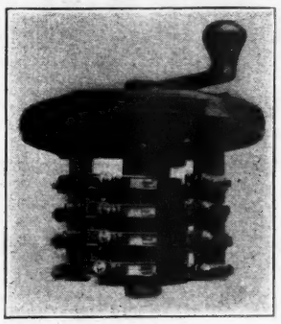


Fig. 83.

Star-delta switch with inclosing casing removed to show the mechanism.

reduces the voltage impressed on each to a value a little under the standard 65% tap usually selected with autotransformer starters. The initial current is about one-third the value it would be if the full voltage were impressed.

After allowing the handle to remain in the "start" position, while acceleration takes place, it is thrown over to the "run" position, the mechanism shifting so that each phase is given full voltage. A mechanical interlock also makes it impossible to move the handle to "run" without first moving it to "start." To employ a starter of this type it is necessary to have the motor terminals brought out to allow for the star and delta connections. Standard maximum capacities in starters of this type are 10 hp. for 110-volt motors; 20 hp. for 220-volt motors, and 25 hp. for 440 and 550-volt motors.

Speed Regulators for Squirrel-Cage Motors.—Squirrel-cage motors are in practically every case run as constant-speed machines, and there are, therefore, no standard types of speed regulators made. There are on the market multispeed squirrel-cage motors in which, by the incorporation of more than one winding, two or more normal running speeds are provided depending upon whether there are two or more windings.

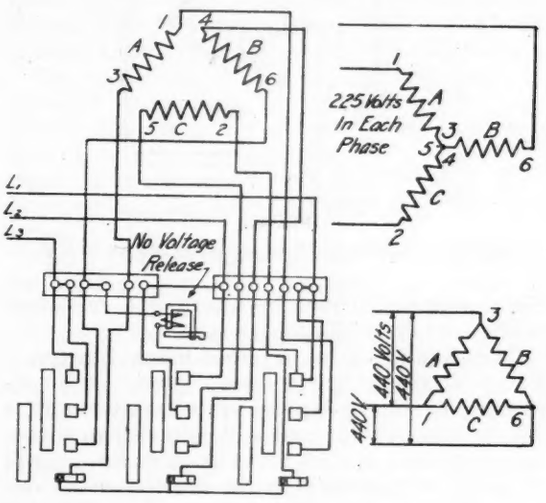


Fig. 84.

Connection diagram for star-delta method of starting squirrel-cage motors.

The controller for a multispeed motor consists of a small drum with fingers and contacts for commutating the connections to the various motor windings.

Starters for Slip-Ring Motors.—Manually operated starting apparatus for use with slip-ring type of polyphase induction motors include small face-plate types, multiple-lever types, and inclosed-drum types, all of which cut down the

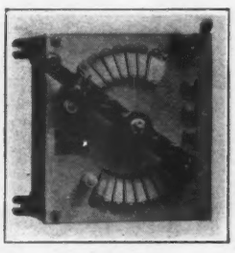


Fig. 85.

Face plate or sliding-arm type of starter for slip-ring motor.

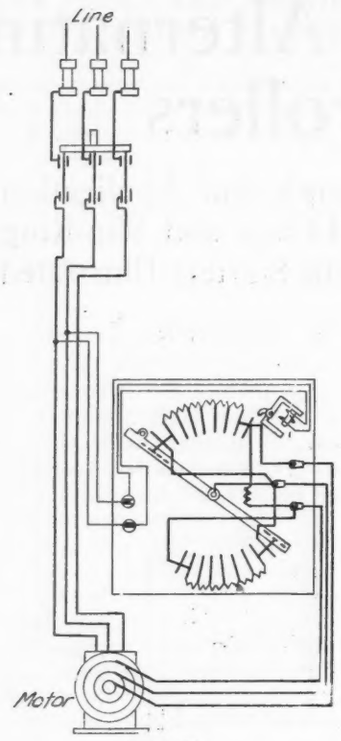


Fig. 86.

Connection diagram for type of starter shown in Fig. 85.

initial starting current by inserting a resistance in the secondary circuit.

The Sliding-Arm or Face-Plate Starter.—Except in places where open contacts are undesirable, the simple hand-operated starter with a sliding arm may be used with slip-ring motors—2- or 3-phase—in sizes up to 25 to 40 hp. It will be noted by referring to the illustration of one make of this class of apparatus (Fig. 85) that there are two sets of contacts and that the sliding arm carries two contact shoes, one near the handle and the other at the opposite end of the lever.

The amount of current taken by the primary of the motor depends upon the resistance of the secondary. The resistance of the secondary is cut out as indicated in the diagram of connections, Fig. 86. The resistance is inserted in two phases of a 2-phase motor, and the same for a 3-phase motor. When normal speed is reached

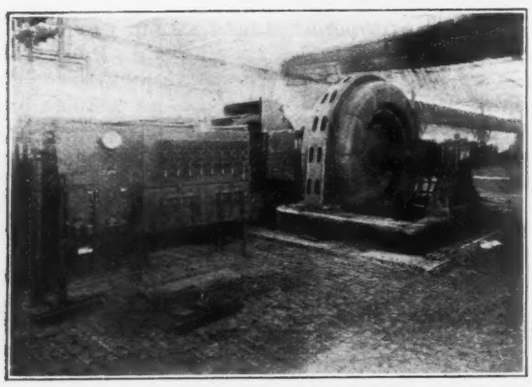


Fig. 87.

A-c., multiple-switch type of hand-operated starter used in connection with a 600-hp., 220-volt motor driving a tube-rolling mill.

the windings of the motor are connected together and the operation of the motor is then like that of a squirrel-cage motor.

The advantage in starting is that a heavier load can be connected to a slip-ring motor and smoother acceleration secured through the ability to connect resistance in the secondary circuit and gradually cut it out.

Multiple-Lever Starters.—These are similar to starters used with direct-current motors, and are designed for use with motors of larger capacity than can be started by sliding-arm apparatus. Each lever carries contact shoes which allow the cutting out of steps of resistance in all three phases of the circuit.

The closing of the levers in succession cuts out steps of resistance simultaneously in the phases, just as the sliding-arm starter does. In the installation view, Fig. 87, a 600-hp., 2200-volt starter of the multiple-lever design is shown, the resistors mounted back of the slate being of the grid type.

To prevent excessive wear and arcing from

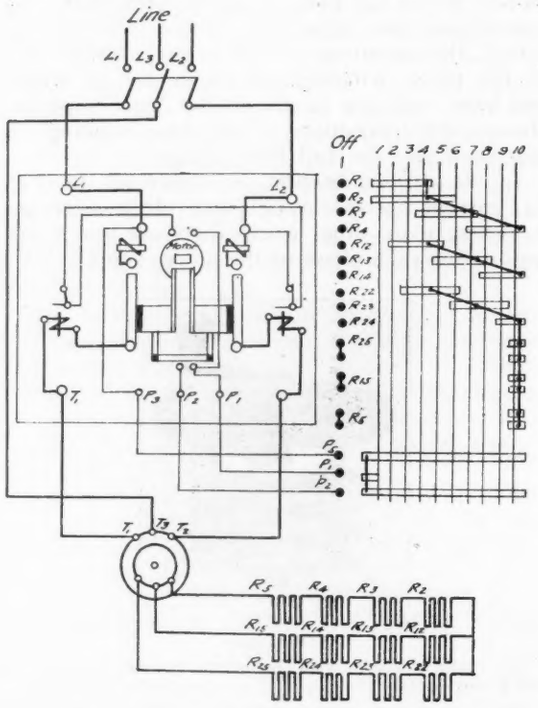


Fig. 88.

Connection diagram for secondary-resistance type of drum starter, used with 3-phase slip-ring motor, with magnet switch in the primary circuit. The magnetic switch is actuated through the three lowest fingers in the drum so that complete control is secured by manipulating the handle of the drum starter.

rapidly making a starter of this type inoperative, main and arcing or auxiliary contacts are provided. The contact at the top is the auxiliary contact, and the copper-leaf brush contact below is the main current-carrying contact.

When the handle is pushed down the auxiliary contact first touches the renewable contact on the slate front, and then as the handle is further pressed and locked the main contact is made, a wiping action keeping the current-carrying surfaces clean. In opening or breaking the circuit the main contacts open first. No arc results because current still flows from the stationary and renewable contact on the starter front to the

auxiliary contact of the lever. When this auxiliary opens an arc results and the constant repetition of this arcing wears and pits the surfaces. These contacts are cheaply and readily renewable and are used to save the main contacts.

Drum-Type Starters.—Where workmen are liable to mishandle the sliding-arm starter, or where dust or other particles may be present in sufficient quantity to make open contacts undesirable, manufacturers offer inclosed drum-type starters. Their external appearance is simlar to that of d-c. drums, and the various manufacturers usually employ standard fingers and contacts in the several styles. Low-voltage release may be provided by means of a separate magnetic switch.

By the addition of three fingers, as shown in the diagram, Fig. 88, closing of the primary circuit and handling of the secondary circuits may be cared for from one drum controller.

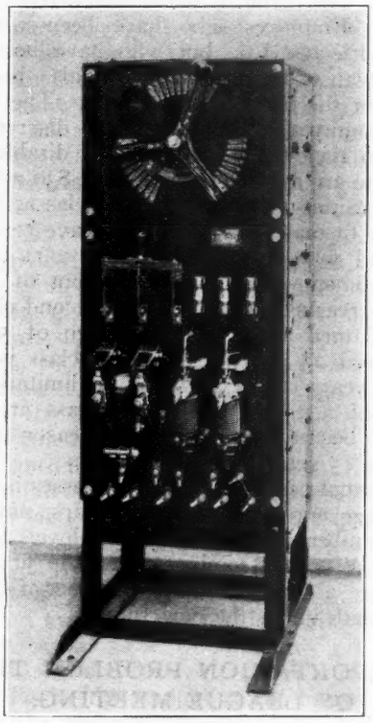


Fig. 89.

Manually operated speed-regulating panel located on the upper portion of this floor panel which also carries knife switch fuses, main primary magnet switch and overload relays. The speed regulator at the top is often made a separate unit and is arranged for wall mounting in the smaller sizes.

The three primary fingers connect to a magnetic main switch which is opened when the control handle is moved back to the "off" position. When an overload occurs, or after any interruption in the current supply, the motor with this type of control cannot start up unexpectedly with no resistors in circuit, because the main magnetic switch trips and the handle must be moved back to the "off" position. After this it will pick up the main magnet switch in the primary circuit, but the resistors will be in the secondary circuit and will limit the initial current.

Manually Operated Speed Regulators for Slip-Ring Induction Motors.—Except where specially designed squirrel-cage motors are used

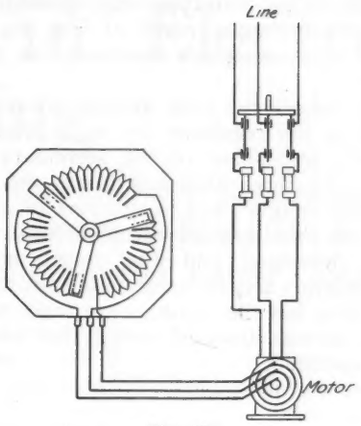


Fig. 90.

Connections for secondary type of speed regulator used with 3-phase, slip-ring motor.

speed regulation of a-c. motors is usually accomplished by the manipulation of external resistance in the rotor circuits of slip-ring motors.

The speed control of a squirrel-cage motor of standard design may be accomplished by connecting the primary or stator winding to various taps of an autotransformer, or by means of resistors inserted in the primary circuit. Both these methods are inefficient since they effect the torque.

Speed changes below normal running speeds are obtained with slip-ring motors by means of various types of controllers for varying resistance in the secondary circuit. Of the hand-operated regulators there are again the sliding-arm, the multiple-lever and the drum type.

The range of speed possible is not as great as with a direct-current motor, being similar to the range of a shunt motor provided with a regulator carrying armature resistors only.

While for starting a slip-ring motor resistance in two phases of a 3-phase motor is satisfactory, resistors are provided for all three phases when designed for speed-regulating duty because they are in circuit for longer periods and maintain a balanced load on all phases of the motor. A regu-

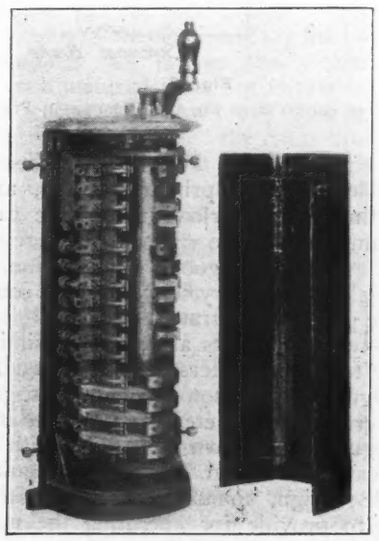


Fig. 91.

General Electric type of drum controller used for the speed regulation of slip-ring motors through secondary resistance.

lator of the sliding-arm type with open face plate is shown in the upper panel of Fig. 89, which section is often mounted separately on a wall-type panel.

At slow speeds the total amount of resistance furnished in the regulator for each phase is in circuit with one phase of the secondary motor winding. All three sliding contacts are moved by the same handle, and as sections of resistors are cut out the voltage drop across the resistances decreases and the speed increases. Speed regulators are, of course, used for the starting duty also, but the resistors are made to withstand the current for any periods for which the motor is operated.

In the controller panel shown in Fig. 89 the

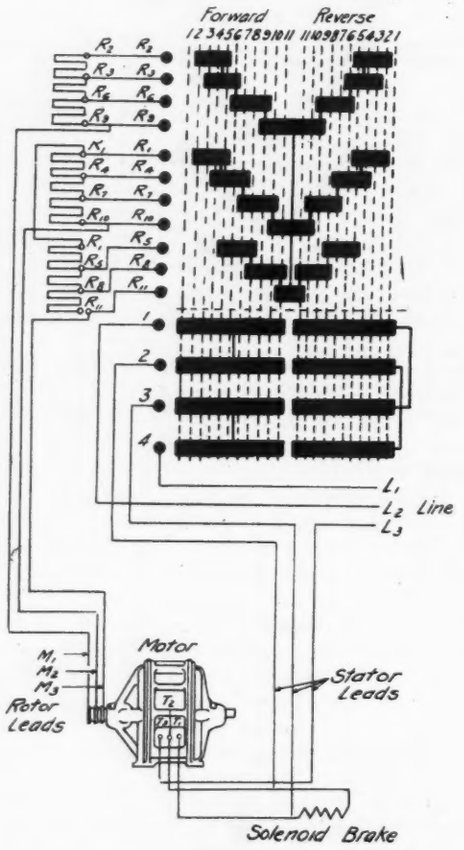


Fig. 92.

Diagram of connections for drum shown in Fig. 91.

primary-circuit knife switch, the fuses, the double-pole magnetic primary switch, and the inverse time-limit overload relays are mounted on the same floor frame with the speed regulating rheostat. This is good construction, since secondary and primary circuits are controlled from one piece of apparatus.

Drum-type regulators are made of similar appearance to drum starters, and are used for the speed regulation of motor-driven fans, printing presses, cranes, hoists, etc. A G.E. type of drum speed regulator is shown in Fig. 91 with the inclosing casing removed. This is a regulator of reversible design, commutating the motor connections to provide for operating the motor in either direction. The diagram of connections in Fig. 92 show the use of a solenoid brake which is energized through fingers and contacts in the drum for quickly stopping the motor when reversing.

For particularly heavy service, and for large equipments, the multiple-lever principle is also employed in the design of controllers to regulate the speed by the secondary-resistance method.

(To be continued.)

WESTERN ELECTRIC CO. INCREASES EMPLOYES PENSIONS.

The Western Electric Co., which for many years has been giving monthly pensions to its older employes, has announced a broadening of its policy. Several hundred veterans of the company will be benefited by the changes made public by J. W. Johnston, treasurer of the company, and chairman of the Employes' Benefit Fund Committee. The board of directors has voted to increase the minimum pension from $20 to $30 a month. The action is made retroactive to July 1, 1920. Employes who have been with the Western Electric Co., but who have been pensioned because of disability, may also be benefited under the more liberal ruling. The benefit fund committee is given special discretionary powers to review the cases of the disabled employes who are not receiving at least $30 a month.

The pensions given are of four classes. They are given to male employes who have served 20 years, and who have reached 60 years of age, and to women with the same amount of service who have reached 55 years. The second class includes all men aged 55 and women of 50 who have served 25 years. The third class is based upon 30 years of service with no limitations on account of age. In the fourth class are those who have been totally disabled by reason of sickness after 15 years with the company.

The annual pension in all four classes is 1% of the average annual pay for 10 years, multiplied by the number of years in the employe's term of service. Workers coming under the first three classes are assured of a life income of at least $30 a month under the new ruling.

TRANSPORTATION PROBLEM THEME OF LEAGUE MEETING.

At the regular monthly luncheon of the New York Electrical League, held at the Hotel Astor Apr. 13, the guest of honor was Col. Herman A. Metz, former comptroller and ex-congressman, City of New York, who in speaking on "Transportation and City Affairs" declared that public utilities are vitally necessary to existence, the creation of cities and placing civilization on a higher plane. He urged that those interests concerned in New York City's transportation problem get together and after thorough investigation retain what is good in the traction corporations and discard the bad.

Over 200 members and guests attended and the facts presented by the speaker were new information to many of his hearers on the situation.

The use of electricity is assuming a more important place in the operation of coal mines in Oklahoma. The time-honored mule car for hauling coal has been replaced in the Henryetta coal mines by electric cars.

Keeping Accounts in Electrical Contracting

Printed Forms Are Used and One Member of Firm Supervises Tabulation of Items and Summary of Contracts—Provision for Monthly Balance and Accurate Determination of Labor Costs

In figuring contract work—that is, a plan and specification as submitted by architects—a leading firm of contractor-dealers in a western city uses a form printed for that particular purpose. On one side of the sheet is room for itemizing each floor of the job. If it is an irregular job there is space for itemizing each room, with places for the number of outlets, whether ceiling or bracket; also whether single, two, four or more lamps, etc. On the same line as the outlet is space for the plugs, switches, what circuit on the board, as well as the number of feet of conduit necessary to complete that particular outlet; also the wire and a place for the labor required to install the particular material necessary for the outlets marked. When the firm gets through taking off a job, it has carefully measured up every piece of pipe and figured the labor so closely that all guesswork is eliminated. The quantities are then listed and added, giving the number of feet of conduit, wire, hours of labor, etc.

On the reverse side of the sheet are columns for quantities, a printed list of materials with columns for price on each and in total; also a separate column for the finish of the job. The total quantities are obtained from the details listed, and in figuring the cost the prevailing prices at which material can be bought are used. When doing bush and knob work in previous years a method of averages at so much per outlet was used, but not enough conduit work has been done to warrant a trial of this method, unless the firm is not particular as to whether they get the job, in which case they use this method of averages to get a figure high enough to be safe.

After the amount of cost is determined the percentage of expected profit is added thereto and a bid is made out on forms printed for that purpose. At the present time the firm is adding 50% of cost to arrive at the amount they should bid on the job. The copy of the bid and the estimate itself are then filed in numbered envelopes. A 4 by 6-in. filing cabinet is employed to index these envelopes, using the locations as the main index and cross-index under architects, owners and contractors' headings. The files now number as high as 4300, each number representing something in the way of overhead expense without any guarantee of return for the investment. This firm does not attempt, except in a few instances, to follow up an estimate, believing that if their bid is low they will generally get the job.

Method of Filing Data and Opening Contract Accounts.

When a contract is obtained they open a folder in a filing cabinet, which is legal size, and head it by whatever letter of the alphabet it might be, and the next number; as, for instance, the Coliseum would be C, and if 97 was the last number used under C, the new contract would be C-98. All papers are transferred to this folder; a copy of the inspection report, also all papers which may refer to the contract, as well as plans, and they make a practice of getting a set of plans and specifications of every job they do, so that plans for 5 yrs. back can quickly be found if desired.

At the time of opening the contract the number is entered in a small book in which is kept the inspection number, a record of labor and the material tag numbers. These tag numbers are entered in this book before an order for material is filled, and by this means there is an index to all material charges which should be in the file when the contract is completed.

Up to this point there has been no entry made in the books to indicate this additional contract, but the making of such an entry gives the following information: (1) Amount of contract work on hand; (2) amount of labor and material installed on unfinished contracts; (3) amount of money billed on unfinished contracts; (4) amount of gross profit on finished contracts; (5) amount of actual profit on contracts.

The entries are necessary for any contractor to keep his cost up to the minute and not, as many have done, leave it to accumulate and, unless in special instances, never total up. When a contract is secured a journal entry is made charging an account called "Work to Be Performed" and crediting a "Contract Account."

When materials go out the cost is charged in total at the end of each month to an account called "Cost of Contracts" and credited to "Material Account." Of course, this means figuring cost of each material item, but if this is done the material account tells how much stock there is on hand continually, provided the contractor charges his material account with all purchases. Many contractors depend on their yearly inventory to tell what their stock is. The firm mentioned above posts the cost of each material item to loose sheets, headed "Cost of Contract Sheets," having a separate sheet for each contract, and the total of these sheets must correspond with "Cost of Contract" in the ledger. They do the same with labor; they have a labor account similar to that for material and this account tells how much is paid while the "Cost of Contract" account is charged with what is paid. Each item is posted to the contract on which it applies and the total of the labor charged on these cost sheets must correspond with the total of that shown in the labor columns of the "Cost of Contract." This is the part which must be kept up as will be seen later when, at the end of the month, the finished

contracts are taken out from the unfinished contracts.

When the job is "roughed in," there is sent a bill calling for 75% of the contract, as a rule. One copy of this bill is used as a journal entry and the other is filed in the folder provided when the contract was first opened. The journal entry is posted as follows: The "Accounts Receivable" account is charged and the "Work to Be Performed" account credited. As this "Work to Be Performed" account now stands it shows the amount not billed on contracts which are on the books.

Monthly Balances Show Exact Financial Condition of Contractor.

When the contract is finished—or rather at the end of the month—all finished contracts are handled together and the cost of each contract is charged to "Finished Contracts" and credited to "Cost of Contracts." The cost of each contract is obtained from the cost sheets which, it will be remembered, were to be posted each day. The result of this entry is that all the cost of material and labor on contracts which are finished, and which had been charged to "Cost of Contract" account, are balanced and the account continues to show the amount of labor and material invested in unfinished contracts.

This is the part that appears to be of much importance. How many contractors, when they are asked by Bradstreet, Dun or their bank or jobber for a statement of how their assets and liabilities stand, could swear to the amount of labor and material invested in unfinished work and tell the amount billed against this investment without having to take at least a day or two to check up?

Another entry is made of the amount charged for a contract. This amount is charged to "Contract Account" and credited to "Finished Contracts." The result of this entry is that all finished contracts are taken from what shows in "Contract Account" as live contracts, and this account shows now what total of work is actually under way, while the "Finished Contracts" shows the total gross profit on all work finished, the cost having been charged and the amount secured being credited.

In explaining the above system of the bookkeeping entries used by this firm to obtain a true statement of their contracts, no idea is given of the cost of keeping this work straight, yet it will be admitted that every contractor attempts to do the same thing in his own way. The method as outlined was provided by a firm of accountants who installed the system of tags and records in use by this firm. They made changes in several details but have not found anything that will give them the results they want in any other manner. They go a great deal farther than the system provided because they want to know their profit each month, and they apportion their overhead expense to each job, using the labor on each job as the best basis on which to figure the expense burden, but they do not advise others to attempt to do this. Their business permits one member of the firm to watch this end of the work and it necessarily foots up a large item in the expense to obtain the desired results, but they declare they will not change systems despite the expense.

FEBRUARY EXPORTS OF ELECTRICAL GOODS SHOW INCREASE.

Total Amounts to $13,632,478; Increase of $7,047,274 Compared With Same Month Last Year—Eight Months' Figures Are $84,191,141.

The exports of electrical goods to foreign countries for February were valued at $13,632,478, compared with $6,585,204 for the corresponding month in 1920, or an increase of $7,047,274. For the 8 mo. ending February, 1921, the total exports amounted to $84,191,141, an increase of $30,776,188 over the 1920 figures and an increase of $37,795,560 over the total for the 8 mo. ending February, 1919.

The following classified figures give the detailed data for February, 1921, compared with the corresponding month for the previous year:

Electrical Machinery and Appliances (except locomotives):	Feb., 1920.	Feb., 1921.
Batteries	$ 526,972	$ 451,756
Carbons	76,586	63,337
Dynamos and generators	363,340	774,607
Fans	78,756	309,373
Heating and cooking apparatus	140,020	381,742
Insulated wire and cables	567,036	1,123,873
Interior wiring supplies, including fixtures	195,514	377,540
Lamps—		
Arc	172	1,234
Incandescent—		
Carbon filament	9,746	14,804
Metal filament	363,391	597,917
Magnetos, spark plugs, etc.	251,876	159,513
Meters and measuring instruments	219,454	375,705
Motors	828,727	2,426,433
Rheostats and controllers	86,482	114,235
Switches and accessories	381,203	663,566
Telegraph apparatus, including wireless	16,750	56,069
Telephones	253,457	819,802
Transformers	295,185	1,320,481
All other	1,930,537	3,601,491
Total electrical machinery, etc.	$6,585,204	$13,632,478

AIRPLANE USED TO LAY CABLE IN RECORD TIME.

A 6-mile stretch of land telegraph cables was laid and put into service in 8 min. by a plane that came from its station 40 mi. away in Sweden recently. Of the 8 min., 6 were spent in flight and the other two in making connections. Great possibilities, both military and commercial, are seen by air-service officers in this new enterprise. Equipment of planes for cable laying is simple and inexpensive. The cable is unreeled from the machine in flight with a flag marker at the end to guide signalmen on the ground to it. When over the point at the other end of the stretch of ground to be covered the wire is cut from the reel and the free end weighted, marked and dropped. The men below merely have to pick it up and connect it to begin talking with the forces at the other end.

DISCUSS WORK OF UNDERWRITERS' LABORATORIES.

The American Society of Safety Engineers, at its meeting in New York City, April 22, discussed the subject of "The Service to Safety Engineering Rendered by the Underwriters' Laboratories." Papers were presented on "Safety in Relation to Electrical Appliances," by Dana Pierce, vice-president of the Underwriters' Laboratories, and "Underwriters' Laboratories Organization, Scope and Service," by George B. Muldaur, general agent.

EDITORIAL COMMENT

Business Every Day

The live electrical dealer is no longer in the class of the seasonally busy—he can be up and doing every day in the year, and have profitable deals to attend to in each of the four seasons. Not so many years ago the business of being an electrical dealer could hardly be called a business—it was, rather, an accident. When a house was to be built, if it were to be wired for lights—not electrical service as we know it now—there was a chance to sell lighting fixtures, and the local dealer might have a chance to make a sale. If building was poor the dealer's business was also poor, or it just ceased to exist.

Now, however, such is not the case. The electrical contractor-dealer has a wide-open market full of new prospects every day. He still has the building industry to depend upon for a certain amount of fixture business, but such sales as may come in from this source are no longer of such vital importance to the success of his enterprise. In the spring time, and particularly this spring, the dealer has a good opportunity for the marketing of automatic refrigerators. The stores, hotels, restaurants and the homes of a community are each one a spring-time prospect for a motor-operated iceless icebox. Just a little later these same prospects may all be moved over to the lists of possible purchasers of fans, with still another assignment to the status of heating-appliance prospects in the fall and winter.

The winter months are best for the sale of floor and table lamps and such appliances as have a particular gift appeal. When we consider that it is open season at all times for irons, toasters, ranges, cleaners, washing machines and the hundred other household devices it is evident that there is "Business Every Day" for the live dealer to attend to.

Wiring in Design of the Building

A dozen years or so ago there was apparently little attention given, as a rule, to providing proper location and space for the electric wiring when a new building was being designed. Even in the case of the larger buildings the practice seems to have been common of working out the other details of design carefully and then leaving it to the electrician or the electrical contractor to arrange the wiring as well as he could under fixed conditions already imposed. The result often was that the electrical construction proved relatively costly, and the system when finished was badly lacking in the elements of neatness, flexibility and adaptability to its purpose—conditions which might easily have been avoided if the electrical installation had been given proper thought when the plans for the building were drawn.

Fortunately, the more progressive architects have now abandoned the above practice in so far as it relates to large buildings of the better class. The electrical engineer or the electrical contractor, or both of them, are usually called upon at the proper time to draw up plans for the electrical work, and such plans are incorporated in the design of the building. In the case of small buildings, however, this matter is still too frequently overlooked, the crude and unsightly wiring, poor arrangement of meter locations, outlets, distributing centers, and the like which one so frequently sees being the logical results of this neglect rather than being evidence of a lack of skill on the part of the contractor. The best that the contractor himself can do toward securing a remedy for this condition doubtless is to make the earliest appeal to the architect, or to the property owner himself, when a given job is to be undertaken. If the property owner were shown in time the real advantages of high-class wiring he would in perhaps a majority of cases see to it that the necessary provisions were made for easily securing the right kind of construction.

Another practice which is even worse than the one just mentioned is that of permitting the property owner to cut the money allowance for the electrical work in a given new building to the lowest possible figure. To gratify the owner's desire to make the net cost of the building low expenses are sometimes cut in every possible way, and it is usually the electrical work that suffers most in the reduction. The electrical contractor cannot afford to miss an opportunity to discourage this sort of thing. He should make use of all reasonable means to convince his customer that the ultimate value of any modern building depends in a measure that is very large upon how well it is equipped for electric service, and he should insist always on a liberal allowance for the electrical work and upon the other necessary provisions for its correct installation.

The owner of an industrial building or the home owner seldom stints himself in the matter of service which he appreciates or can see and understand. No architect would have the nerve to specify a roof that he knew would leak every

time it rained, nor would he advise the economy of using cheap glass in the windows and doors of a fine house where the owner would be annoyed by its unsightly appearance. But many architects do not hesitate to advise ways and means of *saving* money for the owner in connection with the purchase and installation of electrical equipment. He relies on the lack of knowledge on the part of the owner in such cases, and knows that he can always pass the blame for the results to the contractor or to the quality of the central-station service.

There is no reason why the good contractors of a community should not be able to clear up this situation with the architects, but where a fair solution is not obtainable there is no excuse why the contractors should not carry the truth straight to the man who pays the bills. Electrical service is appreciated when it is *real* service, and the contractor who gives his customers the conveniences that electricity can provide is bound in the end to make more friends and more profit than the man who takes money in return for materials and work that will only just *get by*.

A Fair Contract

The electrical contractor, like other species of the genus, is brought up on risks and is inclined to accept the reasonable ones without demur; in fact, he may even greet risks with considerable pleasure if there is a prospect of corresponding opportunities for profit connected therewith. A certain number of risks is inherently connected with the business of contracting, and no contractor with a taste for the work would think of shunning these. They introduce an element of uncertainty which adds zest to the work and appeals to the instinct of taking hazards, which does not seem to be entirely lacking in any member of the human family and is sometimes abnormally developed in the electrical contractor. The uncertainties of the weather, the labor market, the delivery of materials, the work of other contractors upon whom he must depend, accidents, fires, and various other contingencies add to the interest of his problem, and often offer opportunities for the exercise of judgment and ability which may be the deciding factors in the determination of ultimate profits or loss.

All of these factors which cannot be determined in advance represent chances which the contractor must face, and if he is wise he covers the possibilities when making up his bid by an allowance for contingencies. There are other elements in the work, however, which could be determined in advance, but upon which the contractor is frequently asked to bid in the dark. Such elements are represented by incomplete specifications or drawings, specifications whose terms are indefinite and subject to interpretation by architect, engineer or some one who has no interest in protecting the contractor, and terms in the contract which place responsibilities upon the contractor for conditions over which he has no control and which he should not be expected to meet.

One meets with contracts of this kind not only in dealing with incompetent or unscrupulous architects, but also in undertaking government work. It is not unusual in the latter case to find specifications incomplete and at the same time including the requirements that all work shall meet the approval of an inspector. In other cases specifications are unnecessarily rigid and inspectors have no authority or interest to permit the slightest departure from the literal wording.

To be perfectly fair a contract should include specifications completely covering the work, while any elements which cannot be completely predetermined so far as the owner's requirements are involved are left to settlement or to determination of cost as extras by an impartial referee. Such an arrangement makes it possible for honest and competent men to bid on work with fair assurance that they are not laying themselves open to unfair treatment. The unsound contract, or the incomplete specification, too often result in the victimizing of the contractor or the owner, or possibly both of them, and seldom if ever result in complete satisfaction.

In defense of himself the careful and business-like contractor will insist upon having a full and complete contract that will protect the customer and tell him as nearly as possible just what the ultimate cost of his work will be and just what will be given in return for this cost. Under such circumstances the customer is bound to be pleased in the end if the contractor has been faithful in his work. If the customer is not pleased with honest work done under a full and fair contract then he is a party to be avoided in the future, but if lack of satisfaction results from neglect in the preparing of the contract then the contractor has only himself to thank for having lost a friend and possible future customer.

Wiring Diagrams for Purchasers

It is doubtful if anything does more to facilitate the proper and convenient use of complex electrical apparatus by its purchaser, actual or prospective, than the practice of supplying wiring diagrams with the equipment when it is placed in service. Yet this excellent policy is often deprived of its greatest value by the failure of manufacturers to include with such diagrams clear and logical explanations of their significance. There are, of course, many instances where the circuit diagram is simple and plain enough to require no accompanying printed explanation, but

even here it is important not to overlook the value of accurately labeling all parts, numbering terminals and designating wires so that there can be no possible excuse for a misunderstanding. Few people realize the extent to which an apparently trifling misconnection in an auxiliary piece of apparatus may upset the performance of a costly generating unit, motor or transforming device, but it is an undeniable fact that safe and efficient operation are both functions of extreme accuracy in the establishment of wiring connections.

A typical instance is afforded by a company which is exploiting an improved type of lightning-arrester equipment for service on high-voltage lines. With each consignment of equipment from the factory blueprints of the wiring are given to the operating officials interested, with an attractively printed folder giving a full description of the apparatus, and a complete exposition in simple English of the working of each circuit and detail of the mechanism under every service condition which can be anticipated. Every step in the performance of the apparatus is set forth in terms which cannot be misunderstood by any wireman, operator or shop employe competent to attach a conductor to a binding post; nothing is left to the imagination and all the materials are provided for the quickest possible detection of trouble and its remedy under the pressing conditions of actual operation. Such a booklet goes a long way beyond the ordinary printed installation card or instruction leaflet supplied with intricate apparatus. It facilitates the memorizing of connections to a remarkable degree and saves the purchaser real money otherwise expended for high-priced labor during the attempts of the latter grade of employes to remember the significance of the wiring diagram itself. In its way, it is as complete as a set of specifications, and in its logical arrangement, readability and value to the operator it meets a want often unsupplied.

Electrical Equipment in Textile Mills

The textile industry ranks first of all industries of the country in motive power used—requiring over 3,000,000 hp., or over one-eighth of the 23,000,000 hp. used by the total industrial plants of the country. The last census shows the cotton mills, of which there are 2500 in the United States, as the largest users of power, averaging 979 hp. per establishment. The woolen and worsted mills, of which there are 1400, averaged 373 hp. per establishment; the dyeing, bleaching and finishing plants, of which there are 700, averaged 278 hp. per establishment, and the knitting mills, of which there are 2300, averaged 83 hp. per establishment.

Of the 3,000,000 hp. used by the textile mills, approximately 75%, or 2,250,000 hp., is generated by steam; 13%, or 390,000 hp., is purchased electric power, and 12%, or 360,000 hp., is water power. About 40% of the primary steam power generated, or 900,000 hp., is converted to electric power by the mills. With the purchased electric power this makes a total electric power of 1,290,000 hp., or over one-third of the power used in the industry. The coal required annually for the textile mills is estimated at 30,000,000 tons, or approximately 12% of all the coal burned by all the industrial plants of the country.

Equipment found in the power plants of the textile mills is the same as found in the power plants of other large manufacturing establishments. The textile industry offers the most important field of the country for the sale of engines and generators, steam and water turbines, boilers, grates, stokers, coal and ash handling equipment, condensers, feed-water pumps, valves, gages, traps, regulators, recorders, piping and other power-plant equipment and steam specialties.

From approximately 1100 motors aggregating 65,000 hp., 20 years ago, the use of electric drive has increased in the textile mills until today it is estimated there are over 100,000 motors installed totalling over 1,290,000 hp. in capacity. While in a number of departments of the mill the group drive method is used and large motors are installed, the tendency is toward individual motors direct-connected to each machine. The average size of the motors used in the textile mills has decreased from an average of over 200 hp. to an average of less than 20 hp. at the present time.

All mills depend upon electricity for interior lighting. The number of lamps will vary from a few in the smaller knitting mills to 3000 or more in the larger mills, while the size of the lamps will depend entirely upon local conditions. Various shaped reflectors are used on the lamps, depending upon the lighting conditions and the nature of the work to be lighted. Electric lights are installed in the mill cottages and community buildings, and ornamental lighting units in the streets.

The generating and applying of 1,290,000 hp., as well as the lighting of the mill and mill village, offer to the manufacturers of generators, motors, transformers, switches, fuses, conduit, wiring, lamps, reflectors, ornamental lighting standards, recording instruments, and other electrical equipment and supplies, a tremendous industrial market for their products.

With all the new construction and alterations that must be made in and around a textile mill there is ample opportunity for the live contractor. In addition to this the general electrical merchandise business of the community should serve to help make up a good and profitable enterprise.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

LIGHTING INDUSTRY IN FURTHER PROGRESSIVE ACTION.

Another Step Taken Toward Co-ordination in Ranks of Fixture Manufacturers, Illuminating Glassware Guild and Retail Dealers.

Plans leading to greater co-ordination among the lighting fixture and illuminating glassware manufacturers and the lighting fixture dealers were discussed at the meeting of the Executive Committee of the National Council of Lighting Fixture Manufacturers held at the Old Colony Club, Hotel Traymore, Atlantic City, April 18-19. Matters carried over from the Buffalo convention in February were also taken up. Included in this were committee reports on the place for the next Fixture Market (not yet definitely determined) and the report of the Committee of Six, authorized at Buffalo to study and suggest means for developing greater co-ordinated effort among the three allied divisions of the fixture business.

A midsummer convention has been determined upon, but the place is not yet arranged. Most of the business sessions of the National Council will be held at this midsummer meeting so as to conserve the time of the manufacturers at the Annual Fixture Market, and in this way co-operate with the dealers and assist them in building up their organization. As a matter of fact, the Annual Fixture Market is properly a dealers' affair arranged for their information. Service by the manufacturers, rather than business sessions for the manufacturers, should be featured.

President Fred Farmer announced the following appointments to committees authorized at the Buffalo Convention and Fixture Market:

Ways and Means: Herman Plaut, L. Plaut & Co., New York City; Robert Biddle, Biddle-Gaumer Co., Philadelphia, and Bernhard Blitzer, Lightolier Co., New York City.

Policy: Charles E. Verhunce, R. Williamson & Co., Chicago; E. F. Guth, St. Louis Brass Manufacturing Co., St. Louis, and J. F. Schwartz, Edward Miller & Co., Meriden, Conn.

Permanent Fixture Market: For the manufacturers—D. C. Dehancey, Crown Electrical Manufacturing Co., St. Charles, Ill., and N. W. Belmuth, Shapiro & Aronson, Inc., New York City. For the dealers—W. E. Thompson, Hatfield Electric Co., Indianapolis, and H. I. Sackett, H. I. Sackett Electric Co., Buffalo.

Later Monday afternoon the Board of Governors of the Illuminating Glassware Guild met to arrange details of their Tuesday luncheon and meeting.

Joint Meeting of Three Organizations on Tuesday.

On Tuesday morning there was a joint meeting of the Executive Committees of the National Council of Lighting Fixture Manufacturers and Fixture Dealers' Society of America, and the Board of Governors of the Illuminating Glassware Guild. The principal business before this session was the discussion of the plan of the Committee of Six, referred to in a preceding paragraph. This committee had previously met on March 22 at the William Penn Hotel, Pittsburgh, and had drawn up a plan of organization which led to the adoption of a motion to form a Conference Committee of Nine to consider all matters of common interest beyond the scope of the individual division. Three of the members of this Conference Committee are to be furnished by each of these divisions—including the respective presidents, treasurers and third member-at-large from each division. In addition to the presidents and treasurers the men appointed for this important work are William Horn for the National Council, C. J. Netting for the Fixture Dealers, and W. F. Minor for the Illuminating Glassware Guild.

At a later Executive Committee meeting of the National Council, B. F. Klein was elected treasurer. C. H. Hofriehter remains as assistant treasurer in addition to his duties as secretary.

At noon on Tuesday at the Traymore luncheon was served to the members of the Illuminating Glassware Guild and a number of selected guests.

Mr. Goodwin's Vision of a New Type of Trade Association.

Immediately following the luncheon President C. H. Blumenauer called the meeting to order and introduced W. L. Goodwin, assistant to the president of the Society for Electrical Development, as the first speaker. Mr. Goodwin has a vision of a new type of trade association built upon an economic rather than a defensive basis and believes associations such as the three allied fixture associations should eventually become departments of an association of the entire electrical industry with liaison committees arranged to eliminate duplication of effort and improve the overall efficiency. He stated that although certain organizations of employes had available funds for propaganda and general welfare amounting to hundreds of thousands and occasionally millions of dollars, yet trade associations were notoriously short of funds to properly carry on their legitimate work.

Before forming any trade association Mr. Goodwin recommends that those contemplating such a move should study the industry thoroughly from the economic standpoint to see what the present and future opportunities are, and also the place of the particular association group in the scheme of the general industry. To successfully develop such an association, ideas of general application within the group should be released freely by the individual concern, thereby reflecting credit on the originator also. General market conditions must be followed closely, including

their relation to labor and transportation problems, etc.

Freight rates are claimed to be high largely because of lack of proper terminal facilities rather than high wages for operation. Proper terminal facilities would enormously increase the efficiency of the freight car expressed in percentage of time actually moving. The present figure is approximately 5%, which is ridiculously low. The manufacturing of illuminating glassware should be based on the efficiency of the complete unit from an illuminating engineering standpoint, combined with attractive decorative effect and adaptability to the particular use for which intended. If manufactured efficiently along these lines the question of price will take care of itself and every manufacturer may feel he is contributing to the economic development of an essential industry.

Gathering of Trade Statistics Recommended by Mr. Stevenson.

Following Mr. Goodwin's talk President Blumenauer next introduced C. R. Stevenson, the new-business manager of the I. G. Guild, who gave a preliminary talk emphasizing some of the points brought out by Mr. Goodwin, particularly the value of co-ordinated effort for individual benefit through greater efficiency and service, and wider distribution of the product.

Mr. Stevenson favors an adequate wage basis but thinks that some wage reductions are necessary to properly proportion the wage scale among the various classes of workers, skilled and unskilled. He also believes it to be fundamental that efficient management should be properly rewarded and that stockholders should receive a fair return on their investment. Industrial capital in the United States seldom averages higher than a 6% return in general, although some individual companies do better. The most successful concerns produce goods as cheaply as possible, allowing wider distribution and guaranteeing greater returns for stockholders, management and employes as well. He also believes that the various industries should be educated to conduct their pricing on the basis of control of known costs. Then competitive conditions become fair, emerging from the "cut-throat" stage. He also recommends the sustained gathering of trade statistics as a guide to individual production planning.

Then the Illuminating Glassware Guild entered into business session to consider Mr. Stevenson's plans for developing the proposed costs system and production efficiency program based on statistics and other information gathered. This part of the program was referred to the new Conference Committee.

The Tuesday sessions terminated with an informal evening meeting of the Conference Committee, at which plans were made for the next meeting and subjects suggested for discussion at that time.

On Wednesday morning the unfinished business details from the Illuminating Glassware Guild meeting of Tuesday afternoon were completed, this being the final session of the Atlantic City meetings.

At intervals between business meetings the members of the three associations took advantage of the numerous opportunities for diversion on the boardwalk, nearby golf links, etc., and the improving of acquaintances and goodfellowship resulting from this social contact has added materially to the benefits derived from the business sessions.

U. S. CHAMBER WILL DISCUSS COAL AND FOREST RESOURCES.

At the ninth annual meeting of the Chamber of Commerce of the United States to be held at Atlantic City, N. J., April 27-29, the question of "Our Government's Relation to Domestic and Foreign Oil Resources" will be gone into by leading business men from all over the country. This subject will come up for discussion before the group meeting of the Chamber's department of natural resources production.

Other subjects which will receive the attention of this group meeting are: "The Government's Relation to Our Coal Resources" and "The Government's Relation to Our Forest Resources." The National Chamber has just announced the appointment of a committee to study the whole question of the forestry situation of the United States with the ultimate view of suggesting a forestry policy. This committee will hold its first meeting at Atlantic City at the time of the annual meeting.

ELECTRICAL CREDIT ASSOCIATION TO MEET NEXT MONTH..

Effect on Sales of Rigid Credit Policy Among Subjects to Be Discussed at Richmond Meeting of National Organization.

The 22nd annual meeting of the National Electrical Credit Association will be held May 19-20 at the Hotel Jefferson, Richmond, Va.

The tentative program follows:

May 19, 9 *a. m.*—Registration; assembly in convention hall; greetings by the president; reports of board of managers, auditing committee and secretary-treasurer; announcements of committees on arrangements and entertainment.

May 19, 10:30 *a. m.*—Address on "The Business Outlook," by John M. Miller, president of the First National Bank of Richmond; and discussion on the subject of "Effect on Sales of Rigid Credit Policy," to be led by a member of the New York Association; new business; amendments to by-laws; operative resolutions, etc.

May 19, 2 *p. m.*—Address on "Better Business Methods," by J. A. Corcoran, General Electric Co., Schenectady, N. Y.; discussion on "Present Day Credit and Collection Problems and How to Meet Them," to be led by a member of the Chicago Association; recess to visit the historical places of interest in and about Richmond.

May 19, 6:30 *p. m.*—Annual dinner, followed by addresses on "Need for Sound Economic Thought," by Francis H. Sisson, vice-president of the Guaranty Trust Co., New York City, and "Transportation Problems and Their Solution," by W. J. Harahan, president of the Chesapeake and Ohio Railroad Co.

May 20, 9:15 *a. m.*—Unfinished business; reports of committees; discussion on "Is the Credit Man a Business Builder," led by a member of the Philadelphia Association; address on "Public Utilities—Have They Seen Their Worst Period?" by Thomas W. Wheelright, president of the Virginia Railway & Power Co.; discussion on "Handling the Slow and Embarrassed Customer," led by James A. Loring, secretary of the New England Association; adjournment for luncheon at the Richmond Golf Club, with tournament play during the afternoon.

Miscellaneous Discussion—The following themes will be brought up for discussion during the convention:

"Association Problems and Remedies," led by Albert H. Elliot, secretary of the Pacific Coast Association; "Marketing Household Devices"; "Revision of Income Tax Laws"; "Business Conditions in the South and the Future Outlook"; "Value of Accounts Receivable of Dealer-Contractors"; "Sales-Manager's Viewpoint of the Credit Department, Helps and Hindrances, Proper and Improper Methods, Co-operation and Co-ordination"; "Value of E. C. A. Membership"; (a) the general manager's viewpoint, (b) the sales manager's viewpoint, and (c) the credit manager's viewpoint; "The Function of the American Finance Corporation," and "Electric Credit Clubs."

RESIDENCE LIGHTING EXHIBIT TO BE CONVENTION FEATURE.

Lighting Sales Bureau, N. E. L. A., Will Introduce Many Lighting Novelties in Its Exhibit at the Drake Hotel, Chicago.

The Lighting Sales Bureau of the National Electric Light Association, under the chairmanship of O. R. Hogue, has decided that the residence lighting exhibit will be the sole exhibit of the Lighting Sales Bureau at the annual convention in Chicago, May 31-June 3. The Residence Lighting Division, under the chairmanship of M. Luckiesh, is preparing this exhibit. It will consist of a large composite room and several booths on the mezzanine floor at the Drake Hotel. The large demonstration room will be a duplicate in many respects of the demonstration room which Mr. Luckiesh has had in operation in the Laboratory of Applied Science, Nela Park, Cleveland, for several years, but additional features will be added. Its chief aim will be to demonstrate lighting effects and their possibilities, which is in line with the broader movement of considering lighting effects as the final result rather than to consider fixtures in the usual narrow sense.

Many novelties will be introduced and special emphasis on the entire exhibit will be given to the demonstration of the charm and effectiveness of tinted light. An individual booth is being constructed which will show the extensive possibilities of portable lamps in the home. Another booth will take up various features of residence lighting. The aim is not only to depict the present possibilities, but to prophecy the future of light in the home.

Wiring diagrams on a large scale will demonstrate adequately the wiring and lighting of residences. These diagrams are actual reproductions of the wiring which has been installed in various homes by those who are capable of presenting the subject to the householder in a manner which convinces him that light is a wonderful medium for making a house a home. To summarize, it may be stated that the primary object of this exhibit will be to demonstrate that light is a medium superior to all others when cost is considered in making the house an interesting and desirable place in which to live.

I. E. S. SUBMITS HEADLIGHTING SPECIFICATIONS.

The Illuminating Engineering Society has submitted its "Automobile Headlighting Specifications" to the American Engineering Standards Committee for approval. The specifications are submitted in accordance with the special provision in the procedure of the Committee, under which important standards in existence prior to 1920 may be approved without going through the regular process followed in new work.

The specifications have been adopted in their essential details by the states of Wisconsin, Connecticut and Maryland, and by the Province of Ontario, and have been endorsed by the Standards Committee of the Society of Automotive Engineers; by the International Traffic Officers' Association, and by the conference committee on Uniform Vehicle Laws, representing some 30 different organizations, under the auspices of the National Safety Council.

The American Engineering Standards Committee would be very glad to learn from those interested of the extent to which they make use of these specifications, and to receive any other information regarding the specifications in meeting the needs of the industry. The headlighting specifications of the Illuminating Engineering Society may be found in the Transactions of the Society, Vol. XV, No. 4, June 10, 1920. Copies may also be obtained from the American Engineering Standards Committee, 29 West 39th street, New York City, at $0.10 each.

PERSONNEL OF INDIANA PUBLIC SERVICE COMMISSION.

The following appointments have been made to the Indiana Public Service Commission by Gov. Warren T. McCray: George M. Barnard, Newcastle; Maurice Douglas, Flat Rock, and John W. McCardle. The appointment of Mr. Barnard is to fill the unexpired term of Paul P. Haynes, who resigned recently. The term will expire May 1, 1924. Mr. Douglas will fill the vacancy caused by the expiration of the term of Fred B. Johnson on May 1, and the appointment will be for 4 yrs. Mr. McCardle's second term begins May 1 and will continue for another 4 yrs. He is vice-chairman of the commission.

SOUTHWESTERN DIVISION, N. E. L. A., TO MEET IN MAY.

Prominent Men in Electrical Industry to Deliver Addresses on Public Relations at Hot Springs Convention.

Martin J. Insull, of Chicago, president of the National Electric Light Association, will be one of the principal speakers at the annual convention of the Southwestern Geographic Division of the N. E. L. A., to be held at Hot Springs, Ark., May 13-14. Another speaker will be Campbell Russell, chairman of the Corporation Commission of Oklahoma. The tentative program for the meeting is as follows:

The general sessions will be held on Friday and Saturday mornings. In addition to the address of welcome, president's address and the reports of officers scheduled for the morning of May 13, one general address will be given. On the morning of May 14 two addresses will be given and the general business session will follow, which will include the election of officers for the ensuing year. On Friday and Saturday afternoons the accounting, commercial, public relations and technical sections will hold individual meetings, at which will be presented the reports of the various

committees. All of the reports will be open for discussion. On Friday evening the annual banquet will be held, at which time an address on public relations will be given. The entertainment features of the convention have been arranged for the intervening times between program features. The morning sessions will begin at 10 o'clock and close at noon; the afternoon sessions will start at 2 and close at 4 o'clock.

I. E. S. DISCUSSES LIGHTING IN MEDICAL FIELD.

Value of Proper Illumination in Hospitals and Advantages of Surgical Lamp Pointed Out at New York Meeting.

Many physician and surgeon members of the New York Medical Society and surgical and dental associations were present at the meeting of the New York section of the Illuminating Engineering Society held April 14, when the subject was the "Use of Light in the Surgical, Dental and Ophthalmological Professions."

The first paper, entitled, "Lighting in the Medical, Dental and Ophthalmological Fields" was presented by Dr. Louisa P. Tingley, Boston. It gave a survey of lighting in the professional fields, showing the commonness of eyestrain and glare to the eyes of both the patient and operator, and concluded with an appeal for the conservation of vision by the attainment of the most efficient illumination with the least eyestrain.

Davis H. Tuck, Holophane Glass Co., New York City, in discussing "Lighting of Operating Rooms in Hospitals" stated that bad lighting was almost a universal characteristic of operating rooms and presented examples from hospitals throughout the country to support this fact. Horizontal and vertical illumination are of equal importance and therefore the light should not be located over the operating table. Uniform 50-ft. candle illumination is desirable, as well as indirect lighting, while the color of the light must be considered.

The paper on "Lighting of Electro Surgical Instruments" by Thorvald Maijgren, Electro Surgical Instrument Co., Rochester, N. Y., presented the history, development, description and advantages of the surgical lamp.

A general review of the three-phase problem in dental illuminators was interestingly and thoroughly discussed by Dr. R. S. Woodward, Electro Dental Manufacturing Co., Philadelphia, in the paper on "Lighting of Electro Dental Instruments," in which he urged that manufacturers endeavor to produce instruments generating less heat, giving a white light, smaller in size and lower in cost.

SATISFACTORY SHOWING MADE BY CITIES SERVICE CO.

The annual report of the Cities Service Co. for the year ended Dec. 31, 1920, shows surplus after charges and preferred dividends of $17,370,463, equal to $43.09 a share earned on the average amount of common stock outstanding, as compared with a surplus of $13,135,590, or $39.09 a share, in the previous year.

In his remarks to stockholders, President Henry L. Doherty said in part: "The public-utility industry may well be proud of the progress made during 1920. Demands for service at the beginning of the year exceeded all previous records, while operating problems, particularly those relating to fuel and labor costs, seemingly were beyond control. The utility companies of the country, working under a fixed maximum return for service rendered, but without any fixed minimum return, were not in position to compete with industrial corporations for new capital required to extend their facilities. Customers were demanding more and more service which the companies were unable adequately to supply without larger increases of plant capacity; the plant increases could not be made without large investments of new capital, which in turn could not be obtained without increases in service rates sufficient to provide for interest and sinking funds, together with eventual repayment of principal."

A. I. E. E. DISCUSSES LIGHTING PROBLEMS.

"Illuminating Engineering" was the subject discussed at the 238th meeting of the Schenectady (N. Y.) section of the American Institute of Electrical Engineers, W. D'A. Ryan, Illuminating Engineering Laboratory of the General Electric Co., being the principal speaker. Mr. Ryan summarized the history of lighting up to the present time and discussed modern lighting practice from the utilitarian and artistic standpoints, and also dealt with street and municipal lighting problems.

N. A. E. C. AND D. WILL MEET IN BUFFALO IN JULY.

Cost Data on Installation Work and Capitalizing Your Opportunities Among Subjects to Be Discussed at Convention.

The 21st annual meeting of the National Association of Electrical Contractors and Dealers will be held July 18-23 in Buffalo, N. Y., with headquarters at the Lafayette Hotel.

The tentative program follows:

July 18, 10 *a. m. and* 2 *p. m.*—National Executive Committee meetings in Tea room on the first floor; registration bureau opens at 4 p. m. in Room 122 on the second floor.

July 19, 10 *a. m. and* 2 *p. m.*—National Executive Committee meetings in Tea room.

July 20, 10 *a. m. and* 2 *p. m.*—Convention sessions in the Ball room on the first floor; opening address by E. D. McCarthy, Buffalo, chairman of the local convention committee; address of welcome by the mayor of Buffalo; response by James R. Strong, New York City, chairman of the National Association; historical address by Charles L. Eidlitz, New York City, first president of the National Association; address on "The Business Outlook," by speaker to be announced later; reports referred to meeting by the Executive Committee; convention photograph to be taken at 12:30 p. m. at the Sailors and Soldiers Monument, opposite the Lafayette Hotel.

July 20, 8 *p. m.*—Reception and dance in the Ball room on the first floor (informal).

July 21, 10 *a. m. and* 2 *p. m.*—Convention sessions in the Ball room; addresses on "What a Trade Association Can Do and What Some Are Doing," by Charles S. Estey, Chicago; "Cost Data on Installation Work," by Kenneth A. McIntyre, Trenton, and "Capitalizing Your Opportunities," by W. L. Goodwin, New York

City, assistant to the president of the Society for Electrical Development.

July 21, 2 *p. m.*—River trip for the ladies.

July 21, 8 *p. m.*—Annual dinner (informal) in the Ball room, followed by dancing.

July 22, 10 *a. m.*—Convention session in the Ball room; addresses on "Financing for the Contractor-Dealer," by Alfred J. Martin, South Bend, Ind.; "The Conduct of a Contracting Business," by M. H. Johnson, Utica, N. Y.; other speakers to be announced later.

July 22, 2 *p. m.*—Trip to Niagara Falls in special trolley cars, leaving corner of Main and Court streets, two blocks from the Lafayette Hotel at the time stated; trip over the Gorge Route at Niagara Falls and a visit to the power house; special trolleys to leave Niagara Falls at 6 p. m. for the return trip.

July 23, 10 *a. m.*—Meeting of National Executive Committee in the Tea room.

TRACKLESS TROLLEY PROPOSED FOR SOUTHERN CITY.

Several Plans Considered for Solution of Transportation Problem Where Old System Needs Repair and Extension.

It is regarded as probable that Greenville, Tex., will have the first trackless trolley street car system in the country. The question of whether the present electric street railways system shall be rebuilt or the new railless car system adopted is under consideration. It is reported that the General Electric Co. is developing a trolley trackless street car for operation upon paved and other smooth streets without tracks. The first of these cars, a 30-passenger one, is expected to appear soon, and will be operated at the Schenectady, N. Y., plant of the company. After that demonstration the car will be operated on a trial line in Richmond, Va., after which if successful in practice as well as theory the Virginia Railway, Power and Light Co. contemplates using these cars in the ratio of about 60% of their other equipment in that city and in Norfolk, Va.

The General Electric Co. has suggested that the trackless trolley car system be considered in the disposition of the street car problem of Greenville, according to H. L. Andrews of the railway and traction division of the company, who has made a special report of the Greenville transportation problem with regard to the possibilities of the trackless trolley. His estimates are based, it is said, on the report of A. N. Feineman, street railway expert of the Southwestern General Electric Co., who conducted a thorough investigation of the matter.

Mr. Feineman's estimate for a trolley car system for Greenville is a minimum of $251,600, which would provide for five cars, the rebuilding of more than 9 mi. of track and the construction of 2.72 mi. of new track. Estimated cost of the trackless trolley car for the same contemplated system and number of cars seating 30 passengers is given by Mr. Andrews as a minimum of $107,000 with the possible maximum of $109,300. The cost of installation of five storage-battery cars over the same mileage is given by L. Klopman in a supplementary report as $199,330. The report of Mr. Andrews, addressed to Mr. Feineman, says:

"The conditions in Greenville are apparently ideal for railless transportation, provided suitable paving is laid or will be laid over the routes to be served. We believe a serious mistake will be made if the city attempts to rebuild the existing railway system and provide rail transportation using either trolley cars or storage-battery cars."

RELATION BETWEEN SCHOLARSHIP AND ENGINEERING SUCCESS.

A close correspondence between good scholarship in college and eminence in engineering is shown in an investigation made under the auspices of the American Association of Collegiate Registrars by Prof. Raymond Walters of Lehigh University, who presented a report in a recent issue of *School and Society*. It was found that, of 392 distinguished engineers graduated at 75 technical schools, colleges and universities, 182 or 46.4% stood in the highest fifth of their classes upon graduation, 109 or 27.8% stood in the second highest fifth, 72 or 18.3% in the middle fifth, 14 or 3.6% in the next to lowest fifth, and 15 or 3.8% in the lowest fifth.

Figures for a group of 189 alumni of five Eastern engineering schools were somewhat different in the upper classes, the second highest scholastic fifth having the largest percentage. In all groupings of the eminent engineers there were less than 4% in each of the two lowest scholastic fifths. Of 730 names on the list of distinguished engineers, practically 80% were found to be collegiate graduates, 16% men of secondary school education and practical training, and less than 5% men who started in college but did not finish.

The arbitrary basis of eminence in this study of a professional group was taken to be the holding of office, membership in important committees and service as representatives of the four "founder" engineering societies—civil, mechanical, electrical, and mining and metallurgy—for 5 years, 1915-1919.

ARKANSAS ASSOCIATION TO MEET.

The annual convention of the Arkansas Public Utilities Association will be held May 11-12 at Hot Springs, Ark. S. E. Dillon, general manager of the Citizens Electric Co., Hot Springs, is chairman of the convention committee.

HIGH-HEAD HYDROELECTRIC PLANT IN SWITZERLAND.

A hydroelectric station at Fully in Switzerland operates under the abnormally high head of 5410 ft. The power house is situated in the Rhone valley not far from Martigny, and the water power is obtained from a lake at an elevation of 7000 ft. above sea level. Near the lake, but nevertheless submitted to appreciable pressure, is a tunnel 1650 ft. long, the iron-pipe line to the Pelton wheels being nearly 3 mi. long.

There are four waterwheels in the power station, each of 3000-hp. capacity. The water leaves the nozzles with a velocity of approximately 590 ft. per sec. The design of the wheels was a problem of considerable engineering interest. They have a diameter of 12 ft. and carry 54 buckets, secured in a mortised groove by means of keys driven axially between them. That the many difficulties of design and construction have been satisfactorily overcome is partly evidenced by the

fact that when a load of 2300 hp. is suddenly thrown off the increase of speed of these turbines is only 3.5%, the guaranteed figure being 7%. These wheels have purposely been built of abnormal dimensions in order to limit the runaway speed to 50% above normal, but the maximum efficiency is nevertheless as high as 82.3%, friction and windage losses being about 5% of the full-load output.

INCREASED EFFICIENCY SHOWN IN FUEL CONSUMPTION.

Public utilities show an increased efficiency in fuel consumption of 5% during 1920, according to tabulations by the U. S. Geological Survey, a saving of about 2,000,000 tons of coal in the production of electricity over that of 1919. In 1919 it took an average of 3.17 lbs. of coal to generate 1 kw-hr. of electricity; in 1920 it took 3.01 lbs. The fuel consumption in 1919 was 385,000,000 tons; in 1920, 412,000,000 tons. The gain in electricity generated was 12.8%.

Herbert Hoover and other engineers point out the tremendous waste in hauling coal over railroads, and handling it in factories and homes. They predict the day when coal will be burned at the mines running giant power plants that will put the country on an electrical instead of a steam-coal basis.

DATA ON POWER DEVELOPMENT IN OKLAHOMA.

The great opportunity for wider development of water-power resources of Oklahoma is shown by the fact that this state now stands 39th in the list of states in the production of electricity from this source. The total production of electricity by public-utility plants from water power in Oklahoma for January, 1921, was 270,000 kw-hrs. California led the United States in the production of electricity from water power in January, showing an output of 253,412,000 kw-hrs. New York stood second and Washington third in this connection. Oklahoma, however, made a far better showing in the production of electricity from fuels in January, only 24 of the states showing a greater production than Oklahoma. Oklahoma produced 17,618,000 kw-hrs. of electricity from fuels during that month.

ELECTRICAL SOCIETY MEETS.

Addresses on "Making Engineering More Efficient," by Harrington Emerson; "How We Test and Train Our Men for Efficiency," by William Maxwell, vice-president of Thomas A. Edison, Inc., and "The Ignition System of the Typical Automobile," by J. F. Leventhal, were given at the 391st meeting of the New York Electrical Society April 21.

VERMONT ASSOCIATION OFFICERS.

The following officers were elected at the recent meeting of the Vermont Electrical Association: President, J. A. Prouty, Newport; first vice-president, I. M. Frost, Rutland; second vice-president, R. P. Osgood, Windsor, and secretary-treasurer, Charles E. Warsaw, Burlington, Vt.

COMING CONVENTIONS.

Chamber of Commerce of the United States. Ninth annual meeting, Atlantic City, N. J., April 27-29.

Arkansas Public Utilities Association. Annual convention, Hot Springs, Ark., May 11-12. Chairman of the convention committee, S. E. Dillon, Hot Springs, Ark.

Southwestern Geographic Division of the National Electric Light Association. Annual convention, Hot Springs, Ark., May 13-14. Secretary, H. A. Lane, Oklahoma City, Okla.

American Washing Machine Manufacturers' Association. Meeting at Sherman Hotel, Chicago, May 18-19. Secretary, Enoch B. Seitz, Otis building, Chicago.

Southwestern Electrical and Gas Association. Annual convention, Galveston, Tex., May 18-21. Headquarters, Hotel Galvez. Secretary, H. S. Cooper, 403 Slaughter building, Dallas, Tex.

National Electrical Credit Association. Annual meeting, Richmond, Va., May 19-20. Headquarters, Hotel Jefferson. Secretary, Frederic P. Vose, Marquette building, Chicago.

American Society of Mechanical Engineers. Spring meeting, Chicago, May 23-26. Headquarters, Congress Hotel. Assistant secretary, C. E. Davies, 29 West 39th street, New York City.

International Railway Fuel Association. Annual convention, Chicago, May 24-26. Headquarters, Hotel Sherman. Secretary, J. G. Crawford, 702 East 51st street, Chicago.

Stoker Manufacturers Association. Annual meeting, Stockbridge, Mass., May 24-26. Headquarters, Red Lion Inn. Chairman of Publicity Committee, R. C. Beadle, 11 Broadway, New York City.

Electrical Supply Jobbers' Association. Thirteenth annual meeting, Hot Springs, Va., May 25-27. Headquarters, The Homestead. General secretary, Franklin Overbagh, 411 South Clinton street, Chicago.

Pacific Coast Geographic Division of the National Electric Light Association. Annual convention, Del Monte, Cal., May 25-27. Headquarters, Hotel Del Monte. Secretary, L. H. Newbert, 445 Sutter street, San Francisco.

National Electrical Light Association. Annual convention, Chicago, May 31-June 3. Headquarters, Drake Hotel. Executive manager, M. H. Aylesworth, 29 West 39th street, New York City.

National Fire Protection Association. Annual convention, San Francisco, June 14-16. Secretary, Franklin H. Wentworth, 87 Milk street, Boston.

Tri-State Water and Light Association. Annual convention, Asheville, N. C., June 15-16. Secretary, W. F. Steiglitz, Columbia, S. C.

Canadian Electrical Association. Annual convention, Quebec City, June 15-17. Secretary, Eugene Vinet, Power building, Montreal, Que.

American Institute of Electrical Engineers. Annual convention jointly with the Pacific Coast convention, Salt Lake City, Utah, June 20-25. Secretary, F. L. Hutchinson, 33 West 39th street, New York City.

North Central Geographic Division of the National Electric Light Association. Next convention, Duluth, Minn., June 21-23. Headquarters, Spaulding Hotel. Secretary, H. E. Young, 15 South Fifth street, Minneapolis, Minn.

Ohio Electric Light Association. Annual convention, Cedar Point, O., July 12-15. Headquarters, Breaker's Hotel. Secretary, D. L. Gaskill, Greenville, O.

National Association of Electrical Contractors and Dealers, Anniversary convention, Buffalo, N. Y., July 20. Secretary, W. H. Morton, 110 West 40th street, New York City.

Illuminating Engineering Society. Annual convention, Rochester, N. Y., Sept. 26-30. General secretary, Clarence L. Law, 29 West 39th street, New York City.

New York Electrical Show, 71st Regiment Armory, Park avenue and 34th street, New York City, Sept. 28-Oct. 8. General manager, George F. Parker, 124 West 42d street, New York City.

CONTRACTING-CONSTRUCTION

A Department Devoted to Various Problems Relating to the Installation, Operation and Maintenance of Electrical Equipment

GOOD CONSTRUCTION PROVIDES FOR FEATURES OF SAFETY.

Industrial Control Equipment Requires Special Consideration to Assure Safety and Reliability.

The Electrical Safety Conference has issued a booklet entitled "Safety Standard for Industrial Control Equipment." The following extracts taken from this booklet should prove of value to anyone interested in the installation of industrial equipment:

Description of Hazards.—Accidents may occur because of contact with a live part of the apparatus. There is a ground of some kind on most power circuits and such a contact will permit current to flow through the person to the ground, which causes a shock and may result in serious injury or death. Touching live parts by the hands or bodies of persons or by metal objects may also cause short-circuits, flashing, etc., which may result in injuries. There is more danger where the voltage of the circuit is high or where there is excessive moisture, acid fumes or other conditions present which might injure the insulation or cause surface leakage, or which might make the floor or platform near the apparatus more conducting.

There may be arcing or flashing when making, breaking or changing the circuit connections even under normal operation. This may be greatly increased by careless or ignorant operation or by abnormal circuit conditions, such as a ground or short-circuit. The danger arises from arcs, sparks and molten metal, which may cause burns or eye injury to persons, or ignition of nearby combustible material.

Certain parts of the control equipment may under working conditions attain a temperature that will burn a person severely if touched. Such parts are the resistors and those contacts which become heated by arcing due to the repeated interruption of heavy currents. Fuses used to protect apparatus against overloads and short-circuits, especially on large power circuits, and with the apparatus near the generating station, occasionally explode with great violence. Such a condition is a possible cause of accident. Where apparatus is in an atmosphere containing certain quantities of inflammable gas, or inflammable dust or flyings, there is danger that an arc or flash at the controller may ignite this mixture, causing a fire and sometimes an explosion.

Persons near the apparatus may be injured by being struck by the handles or levers of circuit-breakers and similar parts of the controller which may move suddenly and unexpectedly, unless these parts are properly located and guarded.

With certain classes of machinery such as elevators, cranes and hoists the motor and load may not move in the expected direction with reference to the operating lever or handle of the controller because of an accidental phase reversal of the supply circuit. This may result in injury to persons because of unexpected direction of motion or confusion of the operator; it may in some cases result in failure of the limit switches and in injury to the machine itself. Persons may be injured by moving parts of the motor or driven machinery should the motor be started unexpectedly by another person or by restoration of voltage after failure of voltage.

Motors and motor-driven machinery may run at excessive and dangerous speeds because of some change in operating conditions, such as separately excited d-c. motors losing their excitation, and series motors losing their load. The operator of such machines as mixing rolls and calenders may be caught by the machinery and seriously injured if the machine is not immediately stopped by an emergency device. Certain machinery, such as elevators and some hoists, unless stopped within certain limits, may do serious damage to persons and to the machinery. Since the operator cannot be relied upon to stop the machine at the limits, some device, such as a limits switch, must be arranged to do so automatically.

Failure of power may cause injury to persons with such machines as cranes or hoists, unless the machine is equipped with a suitable device to stop and hold the load. Excessive current by overheating some part of the motor, controller or wiring may ignite nearby combustible material or so damage the insulation as to leave the equipment in a dangerous condition.

Methods of Protection.—There are two general methods of protection: (a) By construction, and (b) by installation. Some types of industrial control apparatus are so constructed that they provide in themselves the requisite safety features and, therefore, their proper application and use is not dependent upon the conditions of installation and use. Such types are available in many forms, but in many cases conditions of size, operation, convenience of repair and inspection, and other considerations make it impracticable to embody in the control appliances themselves the necessary protective features.

It should therefore be recognized that, in the many cases where complete protection is not provided by the construction of the control apparatus itself, adequate protection must be secured by the proper installation of equipment. An inclosure provided as part of the controller to protect against accidental contact with live parts and from arc or flash makes dangerous parts accessible only by opening a door or cover which is secured in the closed position by a lock, by an interlock or by other suitable means. These inclosures are of the following general classes:

Class 1.—A solid inclosure without slot or other opening.

Class 2.—A solid inclosure except for a slot for the operating handle or openings for ventilation, or both.

Class 3.—Wire mesh, perforated screens or grill work.

INSPECTION DEPARTMENT PASSES ON SPECIAL CASES.

Interpretations of Rules Given Out for Benefit of Contractors and Inspectors in City of Chicago.

A recently published *Bulletin* of the Chicago Department of Gas and Electricity calls attention to certain rules and practices and makes comments on them of interest to contractors and wiremen. The following quotations are taken from the *Bulletin*:

Wires in Conduit—Attention is called to Rule 26 (o), last paragraph, reading:

"Conductors No. 2 B. & S. gage, or larger, must not be deflected where they enter or leave the cabinet, except that conductors of No. 2 B. & S. gage to 250,000 cir. mils, inclusive, if brought into the cabinet, cutout box, junction or pull box opposite to the panel lugs in which they terminate may be deflected sufficiently to permit their attachment to these lugs, provided the gutter of the cabinet is not less than 4 ins. in width."

A heavy cable entering a cutout box, junction box or pull box and, bent sharply at the point where it leaves the bushing, places an undue strain on the insulation of the wire at this point which cable is unable to stand. If this strain is sufficient it will ultimately result in the breaking down of the insulation.

It is the intent of this rule to eliminate this condition.

The most common violation of this rule occurs where pull boxes are inserted in a conduit run for the purpose of making a short right-angle turn, and it is in just

such instances where the conditions stated are most aggravated.

Ordinarily a bend in a conduit system is made with a conduit elbow the radius of which is limited by the rules and the pressure on the wires at the bend extends uniformly over the complete bend.

Wire larger than No. 2 B. & S. gage should, where they leave the conduit bushing, continue in a straight run without bend, except that wires of No. 2 B. & S. gage to 250,000 cir. mils may be deflected as stated in the latter part of the rules. Wires above 250,000 cir. mils should never be bent over the conduit bushing.

Where it is impossible to comply with this rule a porcelain cleat should be placed on the cable and so fastened to the box structure that whatever strain occurs on the insulation will come on the porcelain cleat, or some other device approved for this purpose should be used.

Grounding Portable Motors.—The rules require the grounding of all motors frame. Heretofore the department has not insisted on the grounding of the frames of portable motors because this has not been practicable with the devices obtainable.

In the future, however, motors used as portable coal conveyors, hoists and similar apparatus must have their frames grounded. This ruling shall not apply to small portable motors such as fans, drills, etc.

The ruling will be enforced only on d-c. and single-phase motors. A 3-wire polarized plug and receptacle must be used with the third wire used for the ground connection.

Trolleys Inside of Buildings.—The department intends to restrict as far as possible the use of open trolleys inside of buildings and around yards, and to this end will prohibit in the future the installation of such trolleys, except under special permission in writing, which must be obtained before work is started.

This restriction will not apply to the standard type of traveling crane where trolley wires or rails are so located as to reduce to a minimum the liability of accident from contact or fires from sparks which may be produced.

It applies particularly to monorail hoists and those electrical devices which travel from one point to another.

A trolley will not be permitted if other means of supplying current can be satisfactorily used. Where it is necessary to use trolley wires or rails they must be protected in a manner approved by this department.

Wood Insulation on Cranes.—The rules of this department do not approve of crane trolley wires or rails mounted directly on wood supports. Either standard trolley supports or approved insulating material must be used.

Switches on Signs.—Each electric sign must be controlled by a switch which will cut off all the wires to the sign. If the sign is provided with 2-wire mains a double-pole switch must be used. If 3-wire mains are provided a 3-pole switch must be used. The switch must be located near, and within sight of, the sign. Time switches, flashers and similar switching devices may be arranged to open the ungrounded wires only. This will permit of single-pole switching on 2-wire systems and double-pole switching on 3-wire systems for these auxiliary switching devices.

Risers on Buildings.—The department wishes to discourage as much as possible the erection of "risers" on the outside of buildings. These risers are usually installed either by the owner or wiring contractor, but as they are used for the support of the public-service companies' wires no one assumes the responsibility for their maintenance and it is only a matter of time when they will deteriorate and become hazardous.

Special permits will not be issued where it is possible to install the service in a safe manner without the use of risers.

Contractors should, in laying out services, so arrange them that connection may be made directly from the service outlet to the pole. If a riser seems necessary it should not be installed until the district inspector has investigated the situation and recommended the issuance of a special permit.

Marked Wires.—Rule 26 (a) of the 1920 edition of the National Electrical Code reads: "(After July 1, 1921.) One conductor of twin rubber-covered wires of No. 12 and No. 14 sizes, and of twisted pair wires of armored cable must have a continuous identifying marking readily distinguishing it from the other conductor."

The purpose of this rule is to provide wires which will permit the enforcement of the rule on the grounding of fixtures.

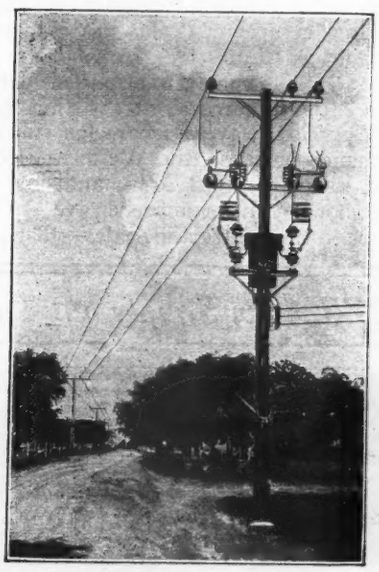
The rule above referred to requires the marked wire in twin wires and armored cables only. However, as single-braid, rubber-covered wires are used extensively for lighting-circuit wiring, a compliance with the rule will require a single wire marked in the same manner as the marked wire of a twin wire.

As it is the intention of this department to enforce the rule as above stated, information is desired from the manufacturers of rubber-covered wire as to their ability to supply marked wires at the time specified.

LIGHTNING PROTECTION ON RURAL POWER LINES.

Safety as an Essential to Satisfactory Service Is Fully as Important in the Country as on City Lines.

Problems of construction, maintenance and operation of rural electric light lines are now occupying the attention of most operators of central station systems. The farmers are much interested in some of these problems and are anxious to learn as much about the economy, expense, safety and danger of electric service as possible or as may be necessary.



Rural Service Pole, Showing Lightning Protection and Disconnecting Switch.

A question some farmers will ask is, will lightning come in over the wires? To meet this the service man can point out that good equipment is provided with arresters and choke coils to prevent lightning reaching the transformer. Between the high-voltage transformer winding and the low-voltage winding connected to the farmer's service is a high insulation in addition to the transformer oil. To reach the house wiring lightning must pass the arresters, choke coils and transformer insulation. Furthermore, all electrical transmission has for years been conducted on the same basis, and the successful results speak for themselves. But if the farmer wants a final insurance against lightning, he can, during electrical storms, just step to the service pole, unlock the switch handle, lower it, and absolutely disconnect the entire service, provided he has proper equipment installed to take care of such a condition.

CONTRACTOR-DEALER

An Exchange of Ideas and Experiences on Advertising and Selling Methods, and Store-keeping for the Dealer in Electrical Goods

MERCHANDISING MANUAL OF HELP TO ALERT DEALERS.

Appliance Manufacturer Issues Elaborate Sales Help as Guide to Retailers of Electrical Goods in Development of Trade.

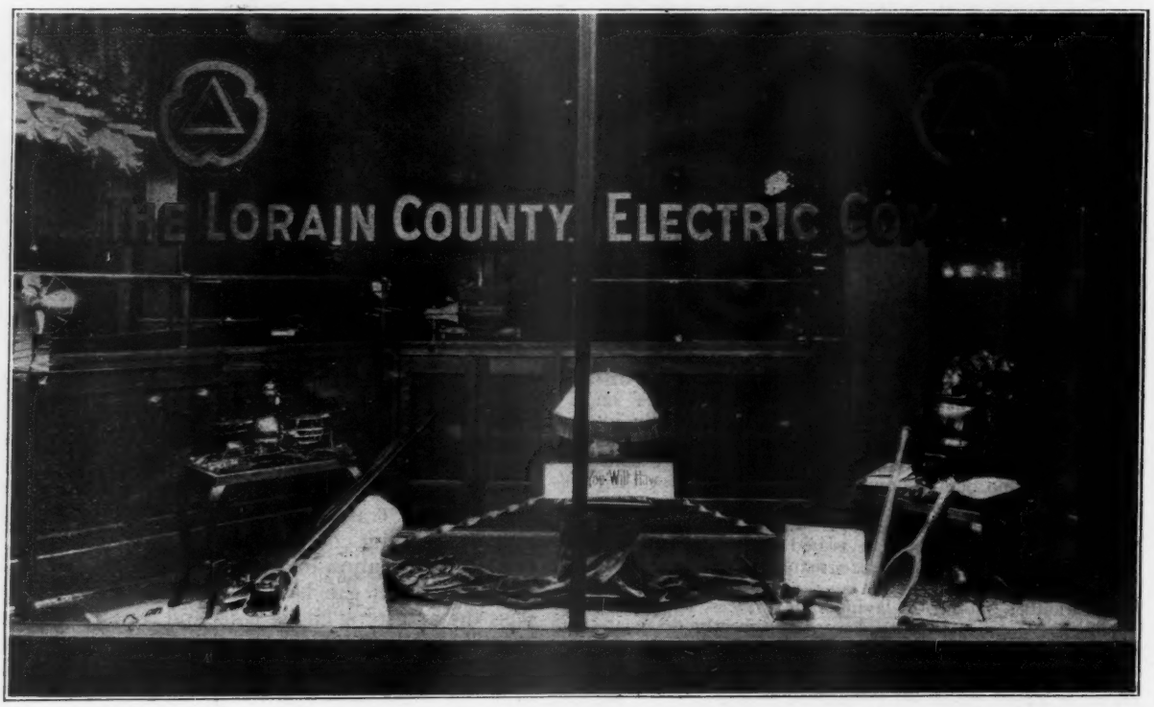
Contractor-dealers throughout the country are beginning to realize that theirs is the chief branch of the electrical industry that is going to show the most rapid increase from day to day and year to year in the immediate future. With 14,000,000 homes in the United States now waiting to be wired, and an immense number yet to be built and prepared for still other consumers of electricity, the hustling contractor-dealer has a worth-while reward ahead of him.

With all this immense electrical demand in view, and for the purpose of assisting the dealer in every possible way to secure his full share of the appliance business, the Western Electric Co. has just issued its 1921 Merchandising Manual, more elaborate and comprehensive—of greater assistance to the contractor-dealer—than any previous issue. It is indeed a merchandising manual de luxe.

This manual is 12 by 19 ins., contains 64 pages with numberless attachments and inserts bound in imitation leather covers and arranged to serve as a ready and complete reference. The material is concisely presented and is designed to give a complete merchandising service in connection with the sale of the five principal appliances of the Western Electric line—clothes washer, dish washer, vacuum cleaner, sewing machine and ironer. Every phase of retail selling, newspaper advertising, direct-by-mail service, window displays, preparation of mailing lists, demonstrations and store arrangement is thoroughly covered. In addition to explanations of the most effective procedures in every case, the book contains samples of the various available selling helps for these particular products.

The contents of the manual is so prepared that a dealer can readily make use of any or all of the forms of modern sales-building methods. As an example, if he wishes to put on a vacuum cleaner campaign the dealer will find illustrated in the

This Window, Simply but Tastefully Dressed, Conveys a Vital Suggestion



This window display possesses the distinction of forcefully and effectively conveying a most practical idea. In effect, it tells the observer that if "You Use More Electrical Appliances You Will Have More Time for Outdoor Games and Exercises." On the left is a table with small appliances and in front of that a vacuum cleaner against which leans a card reading, "Use More of These." A ribbon leads from that card to another beneath the lamp on the center stand, this card reading, "And You Will Have." From that point the ribbon leads to a card reclining against a ball bat and tennis racquet on the right. This card reads, "More Time for These."

book an attractive 6-color cutout window display for ready installation. He will also find a complete series of newspaper advertisements for an intensive local campaign and all necessary material for direct-by-mail advertising. This service should prove mutually beneficial to manufacturer, jobber and contractor-dealer.

ONE DEALER'S LOSS IS ANOTHER'S TRADE GAIN.

Immediate Attention to Emergency Requirements of Housewife Nets Alert Salesman Additional Sale and Customer's Good-Will.

Mrs. Jones, we will call her, was greatly vexed. For the "steenth" time she had pulled the plug loose from her flatiron as it became too hot for the delicate pieces of linen which she was smoothing out after the weekly washing had been done and dried. And with this last pull the cord had parted where it entered the attachment plug, and now she was faced with a delay and the carrying over of part of the ironing into the next day's work.

Mrs. Jones had other things to do on the following day, so she took her broken cord and went to the nearest dealer to have it repaired or get another—she wanted to finish her work. But this dealer politely informed her that the device she had was not included in his line and tried to sell her a new flatiron complete.

Like most people, Mrs. Jones was not just then in the proper frame of mind to be offered a new flatiron or a new anything. She went to another store. Here she met a man who understood her plight and who promptly volunteered to repair the old cord. His customer was evidently pleased, so he made the suggestion that a through-switch would greatly reduce the wear on the cord at the plug and so lengthen the time required to again cause it to fail. This also appealed to the customer, and while she waited for her cord to be repaired and fitted with the new device she examined and admired the goods on display.

Needless to say, the point of this incident does not center about the wisdom of making cords that will fail, for both dealers had the same opportunity, while only one made use of it.

DEALERS! SHOW THESE FACTS TO YOUR CUSTOMERS.

A list of the most popular household electric appliances, showing in 8-hr. days the amount of time each device will save the user in the course of a year, has been prepared by an Eastern electric company. Here it is:

	8-hr. days
Electric clothes washing machine	19½
Electric vacuum cleaner	19½
Electric dish washing machine	13
Electric flatiron	6½
Electric ironing machine	13
Electric sewing machine	3¼
Electric toaster	3¼
Electric percolator	3¼
Electric fan	3¼
Total	84½

In this calculation the saving merits of the devices are set forth in terms of days, but it is pointed out that there is no way of estimating the additional saving of physical effort accomplished through the use of electric service.

Better Salesmanship, Rather than Cut-Price Inducements Now Necessary to Sell Appliances

Advertised Reduction in Electrical Goods, Together with Lack of New Display in Window and Store, Induces Waiting for Still Lower Prices

By J. E. BULLARD

Last fall a dealer wanted to reduce his stock so he went before a notary public and made an affidavit that he was reducing all of his prices 25%. He spent several hundred dollars advertising the sale and looked forward confidently to getting rid of a lot of that stock. It was fresh stock and he was offering many real bargains. People came to the store in sufficient numbers to gratify him but he did not seem to be able to make sales. They came and examined the goods and made a note of the prices, but most of them concluded that they would wait a little longer because they were sure prices were going lower. He was not able to sell enough to pay for the advertising.

Just before Christmas a man purchased a new camera with which he planned to take some pictures of Christmas window displays. He looked at the windows in all parts of the city but was very much disappointed with what he saw. The windows did not seem to be as good as some that had been made the previous summer before people had stopped buying. On a trolley car one night he asked a friend what he thought of the window displays the stores were making for the Christmas season. This is what that friend replied. "The stores haven't anything to make a good display with. They haven't anything but old stock. That's all they are trying to sell. They don't even want to sell new stock so why should they go to the expense of buying it to make a fine window display with."

While she was doing her Christmas shopping a woman kept complaining about the displays she found in the stores. She said that none of them seemed to have anything but old stock; that much of it was damaged; that she had never seen such a poor lot in all her life.

The electric shop of a central-station company placed a lot of portable lamps in the windows and marked them with cut-price tags. The old price was shown crossed out and the new one

was entered below. People looked at the display but very few of them entered the shop and made purchases. Some remarked after this fashion: "Oh, those prices will be cut again. What's the use of buying the lamps now?"

The foregoing gives a pretty good idea of how the public views the present attempts that are being made to sell goods. In some quarters the buying public is being warned that prices are going up again but this does not have the same effect that it did early in 1919 when prices were actually being raised right along. The statement one hears now is: "That's just to try to scare us into buying. Prices will go still lower instead of higher if people simply won't buy."

Other Factors Than Price Must Be Used to Attract Trade.

Price as a sales factor has lost practically all of its power. In order to sell in these days it is necessary to follow those old sales instructions that we used to hear so much about in the days before the war and place price last. Unless the very best reasons are given for buying people are determined not to buy at any price.

It would seem to be an excellent time to dig up some of those old sales instructions and those correspondence courses in salesmanship that we studied back in the days when it required real ability to sell goods, and to review those courses. Real salesmanship will sell goods today just as it did in those days, but things have been so easy for so long a time that it has been easy to forget many of the elements of salesmanship that were used then as a matter of course.

To sell, it is necessary first of all to attract favorable attention. Many of the methods being used today by dealers in all lines are attracting unfavorable attention if they are attracting any attention at all. More attention than ever before must be paid to the advertising that is done. This advertising must be designed to create a favorable impression and inspire confidence. A perfectly logical and understandable reason must be given for every offer made; for every inducement made to create sales.

Window displays must be made just as attractive as such displays can be made. Instead of showing old goods marked down it will pay much better to show new goods, and if the prices at which they are offered are low, explain why that is the case. Merely saying that prices are cut will not make people buy, and the more the windows are used as a stock room for cut-price goods the smaller the number of people who will enter the store.

Optimistic Attitude Necessary to Stimulate Sales.

Above all, there will have to be a little more optimism in the store itself. One reason why business is bad is that one can't talk very long with the average clerk or store proprietor without having him agree in the end that this is not a good time to buy anything. He does not actually advise people not to buy what he sells, but before he is through talking he will mention the fact that he needs a new overcoat, a new pair of shoes or something else, and that he is waiting a little while before he buys. That most certainly is not a good way to create a very great demand for the goods that he sells. If he would start in buying, himself, and if he would speak about what he has bought and insist that this is as good a time as any to buy, he would find it would be much easier to sell his own goods. It is mighty hard to sell anything if the attitude taken by the salesman tends to put the buyer in a non-buying state of mind.

To sell goods we have to arouse interest in the goods. For the past few years no attempt has been made to arouse interest in anything but prices. Now people are too deeply interested in prices. They are so interested in prices, and what they hope to do to prices, that they are going without many things they really need in order to play with prices.

It is high time that everyone talk a lot less about prices and a lot more about goods. Of course, in the past there have been some things offered for sale in some lines which were so flimsy they would not stand much talking about. This, however, should not prevent a dealer talking about the worth-while goods he has, and showing the good features of these goods—why people need them—and giving other more interesting information about their usable value. It is the goods that he wants to get people thinking about and not the price. He would find it lots easier to sell those portable lamps, electric flat-irons or anything else he wants to sell if he would say more about the good features of them and less about the price. It is still possible through the medium of good salesmanship to interest a person to such an extent that he will forget all about the price and make his purchase before he thinks of it, but this requires real salesmanship, something that a great many of us have almost forgotten.

In order to sell goods the dealer must create a desire for them and not stimulate a desire to save money by waiting until prices go lower. There are a great many people today who really desire to buy goods but who are putting it off simply because the dealer does not give them a really good excuse for buying. Showing people and proving to them the desirability of possessing goods is what creates desire. Talking about prices alone, or giving too much attention to the price, never has and never will create desire. Even mention of the price too soon may kill a sale.

There is a certain correspondence school that issues a sizeable booklet. It requires quite awhile to read this booklet. Yet one must read it practically through in order to learn the price of the course because the price is buried in the back part of the book. By the time the average person has read that far he is pretty certain to have arrived at the conclusion that he really must take that course even if he has to mortgage the house or pawn his wife's engagement ring. He has also reached the state of mind where he will consider the course cheap if it does not cost more than $100. When he finally does stumble upon the price, hidden in the middle of a paragraph, he is pleased to find it so low. That school keeps right on selling its courses in ever increasing numbers year after year, good times and bad. It does so because it is applying real salesmanship to the problem.

APPLIANCES and DEVELOPMENTS

New, Improved or Interesting Electrical and Mechanical Apparatus and Devices, and Applications of Equipment and Methods in Practice

New Electric Iron Marketed by Westinghouse.

The Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., has placed upon the market a new

Type "H" Electric Iron.

electric iron, known as the type "H." Service and utility are the features of this iron, and because of its sturdy construction the user is assured of long and satisfactory service. Perfect balance, a comfortable handle, a quick-detachable plug and a carefully constructed heating element make for desirable ironing utility.

An Electric Vacuum Cleaner with Special Features.

Compact, practical and durable, constructed of aluminum and the very best materials procurable are some of the claims made for the new Regina electric vacuum cleaner, type 21, by the manufacturer, The Regina Company, Rahway, N. J. This machine, which weighs 12.5 lbs., has a floor nozzle 12-ins. wide and is adjustable to

Regina Electric Vacuum Cleaner.

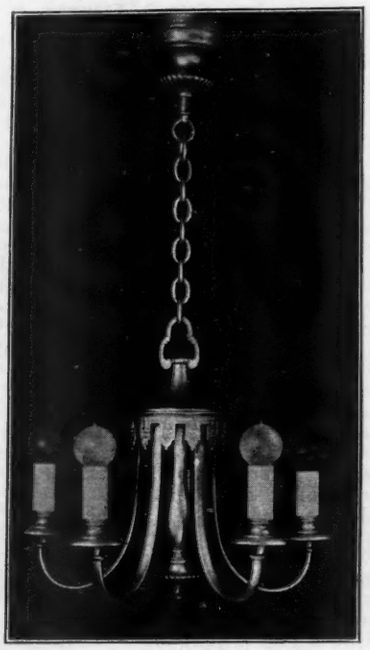
five different heights. The horizontal universal motor makes 8000 to 9000 r.p.m. and has directly connected on its shaft a six-blade 4-in. aluminum fan. The handle can be locked either in a vertical position or at an angle of 30 deg. for tilting and released by the foot operation of a simple but effective device.

The cleaner is equipped with a snap control switch in the handle, 20 ft. of extension cord and will go under furniture 7 ins. high. An exclusive but important feature is the gear-driven adjustable brush in the nozzle which straightens up the nap, loosens threads, hairs and lint and facilitates the gathering of dust and surface litter. Also the lubrication system requires attention only three times a year.

The Regina Model W and Model M are similar cleaners, but instead of a gear-driven brush, the former has in the nozzle a self-adjusting brush which moves up and down, while in the latter machine a stationary brush is located behind the floor nozzle.

Popular and Attractive Dining Room Fixture.

For the dining room or living room the "Radiant" electric fixture No. 2012 is designed, and in such surroundings it fittingly harmonizes with the furnishings and decorations. This fixture is made of solid brass, finished in

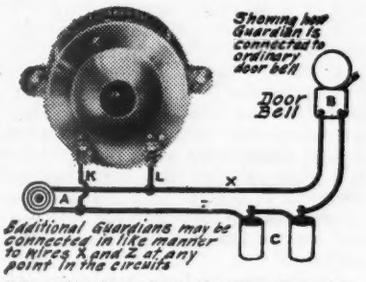


Dining-Room Fixture Finished in Butler's Silver.

butler's silver, has five candle lights and a spread of 18 ins., while its length is 36 ins. This is only one of a complete line of fixtures made by the Radiant Lighting Fixture Co., 33 Bleecker street, New York City, and described and illustrated in its catalog 10A.

Automatic Fire Detector for Home Installation.

The Dee Electric Co., 79 West Monroe street, Chicago, has recently placed on the market an automatic fire detector, known as the "Guardian,"



"Guardian" Automatic Fire Detector Connected to Door Bell.

which can be installed in the home, garage, factory, school, hospital, or any other building. It is stated that the device is not affected by dust, dirt, moisture, etc., and can be tested regularly.

The illustration shows the connection of the device to a door bell, where either a dry battery or a transformer is used. In describing this installation the manufacturer gives the following information: Fasten the "Guardian" to the ceiling near the furnace, or at a central point in the basement; connect two wires to its terminals and to the wires *X* and *Z*, which run to the push-button. Do not cut wires *X* and *Z*, but scrape the insulation off; clean and then snap a spring binding post on each wire; then insert the cleaned and scraped ends of the wires *K* and *L* (connecting to the "Guardian") in the spring binding posts under the tongues, with the wires *X* and *Z*. This makes a permanent connection.

Electric Iron with Heating Unit Resting on Ironing Plate.

The "Sunbeam" is the name of an electric iron recently placed on the market by the Chicago Flexible Shaft

"Sunbeam" Electric Iron.

Co., Roosevelt road and Central avenue, Chicago. The main features of this iron are thus set forth by the company: It has few parts and the

absence of complicated assemblies are features noticeable in the interior. The heating element, pressure plate, terminal posts and all other parts are so rigidly secured that hard usage or even abuse cannot move them from their correct positions. Terminal posts of non-arcing monel metal are threaded into their bases, consequently can be removed or replaced without taking the iron apart. The heating unit, perfectly insulated in sheets of imported mica, rests directly on the ironing plate, and there is no sheet metal or insulation of the composition type to retard the flow of heat and make necessary an excessive heat within the element to maintain the ironing surface at a working temperature. The heat storage plate of soft metal above the element holds a reserve of heat that would otherwise escape through the top of the iron, and supplies it as needed to the ironing surface. Due to the rapid heat-conducting properties of the sheet mica this plate and the sole plate of the iron are practically one piece of metal. This feature means a more satisfactory iron for wet pieces and longer usage after the current is turned off.

The weight of the "Sunbeam" electric iron is 6 lbs. It can be supplied for the standard voltages, and is claimed to be equally satisfactory on alternating or direct current.

Standard Electric Washer Having Simplified Design.

Considerable interest has been aroused among dealers in electric washing machines by the announcement of Sunny Line Appliances, Inc., 4058 Beaufail street, Detroit, that it has perfected and will market a standard electric washer with wringer attached that will retail at a remarkably low price. The name of this most recent entrant in the washing machine business is the "Sunnysuds." The new washer has been the object of a great deal of favorable comment on the part of jobbers and sales executives who have inspected it—the sales manager of a large vacuum cleaner company going so far as to say that its sale at the low price quoted would mark an epoch in the washing machine industry.

The "Sunnysuds" washer is unique in mechanical detail as well as price. Contrary to the customary practice the angle-iron supporting skeleton of the cabinet has been entirely dispensed with. Instead of being built upon an independent frame the cabinet of the "Sunnysuds" is pressed out of heavy steel, so stamped that each section is perfectly rigid and capable of supporting unusual strains and loads. This single innovation enables the manufacturers to effect a great saving in manufacturing costs and to gain at the same time attractive appearance combined with great strength.

Within the white-enameled frame is an oscillating tub constructed of pure copper with seams machine-folded and soldered to assure permanent and waterproof joints. Into the bottom of the tub are rolled deep corrugations which not only act as agitators, but add to the material strength of the tub as well as to its appearance. Normal capacity of the tub is six sheets.

Motive power is supplied by a specially designed forced-draught ¼-hp. motor built by the Domestic Electric Co., Cleveland. The installation of the motor is in accordance with the latest practice, being bolted to a wooden cross member to obtain silent operation, and connected by a line shaft to the [illegible]ing mechanism which is run completely inclosed in

Factory and Product of Sunny Line Appliances, Inc. Fred C. Sebulske, Jr. (Center), President of the Company.

grease. Special attention has been paid to the design and finish on the joints of the gear housing to prevent seepage of grease.

On the right side of the washer are the two operating levers controlling the oscillator and the wringer, the push button switch for starting and stopping the motor being located on the forward right-hand corner of the frame so as to be within convenient reach no matter where the operator may be standing. As is customary in washers of advanced design, both tub and wringer can be operated simultaneously. To compress and release the rolls, the "Sunnysuds" is equipped with a patented aluminum wringer which dispenses with turn screws, the entire operation being controlled by a quarter turn of a double-handled lever in the center of the top cross member of the wringer. Not only does this arrangement permit tightening and loosening of the rolls to any pressure, but it has the advantage of a quick-release mechanism in that a light tap will spring the rolls more than 1 in. apart. The wringer locks in any one of four positions, operation being impossible until the locking lever is in place.

Due to the unsual compactness of the "Sunnysuds," the manufacturers will, by removing the wringer, be able to ship 140 crated washers in a standard freight car. This is almost double the number of washers of equal capacity, but of different design, now being loaded in a standard freight car.

The "Sunnysuds" has been designed and produced after almost a year's effort on the part of the incorporators of the Sunny Line Appliances, Inc. The new company has been capitalized at $250,000, of which a large percentage was subscribed by Detroit business men who were associated with Fred C. Sebulske, Jr., in his previous success, the Crystal Washing Machine Co., absorbed some months ago by the Mallory Industries, Inc. Mr. Sebulske, who is president and general manager of the new company, has a wide acquaintance among the washing machine dealers throughout the country and an intimate knowledge of sales and distribution. He has not only surrounded himself with an organization already experienced in the washing machine business, but the directors of the company comprise experienced business men and financiers. F. P. Goettman, vice-president, has been for many years secretary and treasurer of one of Michigan's largest beverage companies, and treasurer of the Standard Computing Scale Co. The treasurer, W. C. Hegge, is secretary and treasurer of Sievers & Erdman Co., large body finishers and painters, with whom he has been associated for almost 40 yrs., and vice-president both of the Michigan Optical Co. and the Standard Computing Scale Co.

F. P. Heaton, secretary, was for 11 yrs. a member of the Bradstreet organization and later associated with Mr. Sebulske in the Crystal organization. T. F. Comerford, the fifth member of the board, is president of the Standard Computing Scale Co., secretary and treasurer of the Michigan Optical Co. and holder of other large commercial and industrial interests in Detroit.

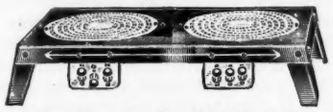
For the construction of its washer the company has leased for a period of years the former Scripps-Booth motor car plant on the east side of Detroit. This modern building has direct siding connection and contains 31,000 sq. ft. of floor space. Machinery is being rapidly installed so that production on a large scale can be immediately started. The maximum capacity of the present plant is estimated at 40,000 washers a year. Plans have been made and contracts have been based on an estimated first year's production of 20,000 washers, of which a considerable percentage has already been spoken for. Although no definite announcement has been made by Mr. Sebulske regarding the company's method of distribution, it is expected that connections will be established in many centers, with smaller dealers drawing upon these as sources of supply. Correspondence with dealers has been proceeding since it was rumored that the company would produce a high grade, standard washer, but the dealer organization will not be completed for months.

Speaking of the future ahead of the new organization, Mr. Sebulske said: "I am confident that it was wisdom on our part to spend the past several months in bringing our washer to mechanical perfection. Had we come into the field 6 mo. ago we would have been compelled to undergo the severe strain of deflation which has affected the washing-machine indus-

try to no slight extent. But coming in as we do, we will begin shipments to a public whose confidence and buying powers is rapidly growing. If there was ever a psychological time for the introduction of a standard, high grade, electric washer and wringer of moderate cost, it is today. The reception of our first announcement, the enthusiasm of our friends and the optimistic opinions of men in similar lines of business convince us that the public will receive the 'Sunny-suds' with genuine eagerness."

New Type of Open Element Hot Plate.

With a view of taking care of the demand which exists for hot plates that can be used for heavy-duty cooking, the Russell Electric Co., 140 West Austin avenue, Chicago, manufacturer



Double Burner No. 251 Hot Plate.

of "Hold-Heet" electrical appliances, has devised a new type of hot plate consisting of a magnesia porcelain element base, which is a very poor heat conductor, so that the majority of the heat developed is radiated to the cooking utensil above and there is a minimum of loss due to heat transmitted through the hot plate. It is stated that the plate will withstand any kind of sudden temperature changes without cracking.

The company states that it has eliminated the old series parallel two-element type controlled by a snap switch and employs three independent concentric coils, each controlled by an independent trigger switch. The first coil is confined to the center of the burner, the second coil covers the intermediate area and the third coil covers the outside area of the burner. In this way the heat can be confined to any portion of the burner desired and much greater efficiency thus ob-

Single Burner No. 241 Hot Plate.

tained. By manipulating the three trigger switches it is possible to obtain seven different heat combinations in a single burner. Controlled in this way each element is operated on its full efficiency whenever it is turned on. The three switches can be turned on or off with one finger at the same time. They are claimed to be very reliable in action and have the further advantage that a person across the room, by glancing at the hot plate, can see whether it is on or off.

Electric Washer With Swinging Wringer.

An electric washer with a swinging action has been placed on the market by the Manufacturers Distributing Co., 415 Fullerton building, St. Louis, under the name of "Pollyanna." The maker claims that this washer introduces a new application of oscillation. The tub in the "Pollyanna" washer is suspended and instead of rocking or sliding it swings. Its rapid swing to and fro creates a double whirlpool—a powerful agitation that washes clothes clean quickly. The tub swings from end to end and back again 56 times a minute, the rapid motion increasing the cleansing power of the steaming hot suds.

"Pollyanna" Electric Washer.

The "suspended" construction features of the "Pollyanna" are thus set forth: (1) It adds the force of gravity to electricity; (2) each downward swing helps the motor, lengthens its life and saves current; (3) the throw up of the water at the end of each swing adds to the agitation of the suds, and (4) the suspended tub simplifies the construction. There are no springs or rivets in the tub. The machine produces a powerful cleansing action without harmful friction, and conserves the life of clothing.

The "Pollyanna" electric washer is inclosed in a cabinet, which is a standard part of every machine. This cabinet is strong and rigid, the corners and legs being so constructed as to resist any chance shock or strain without damage. The cabinet is painted a battleship gray and when not in use a top fits over it. The tub is not riveted to the cabinet or frame, but rests in a cradle and can easily be lifted out when empty. The tub is of copper and is lined on the inside with tin and fitted with a specially constructed lid which prevents the suds from splashing out. The "Pollyanna" washer is a standard machine, holding six to seven sheets or their equivalent. The tub is drained by an ordinary cock accessible through the door in the panel. The washer weighs 200 lbs., the outside dimensions being 38 ins. long, 23 ins. wide by 35 ins. high. The wringer swings in a complete circle and locks in any position. It can be placed to suit any arrangement of tubs or baskets and can be easily lifted out when moving the washer. The frame rests upon rigid iron feet, or it can be shifted easily and quickly to easy rolling casters. The washer is equipped with a standard motor, the machine being driven by a V-shaped belt which can be adjusted in two ways.

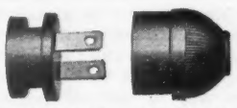
A. C. Gilbert Co., New Haven, Conn., has issued an illustrated catalog covering its "Polar Cub" motors and attachments. The company's model E 6-in. fan and model E 8-in. fan, as well as the portable mixer, are the new items added to the line this year and described in the catalog.

Containers for "Ajax" Plural Socket Plugs.

The following information has been received from the Ajax Electric Specialty Co., 1011 Market street, St. Louis: "Upon resuming production of our plural socket plugs it was necessary to get containers quickly to take care of the immediate demand, we having back orders for over 25,000 on which customers were insisting for prompt delivery. These goods were shipped in cartons of 20, a three-color combination easel and hanger being furnished with each carton. We found, however, that this form of packing was not as popular as our former display carton, so we ordered individual cartons and display cartons and after April 15 we will pack all plural socket plugs in these display cartons, each packed individually. This carton can also be used for a counter-display silent salesman, in addition to our three-color combination easel and hanger which we will continue furnishing."

Two New Cutler-Hammer Wiring Specialties.

A small cord connector, shown in one of the accompanying illustrations, has been designed by the specialty and switch department of The Cutler-Hammer Manufacturing Co., Milwaukee, for use with drink mixers, portable electric heaters, washing and ironing machines, hair clippers, and other electrical appliances, which demand a neat cord connector of small size and adequate capacity. It has the National Electrical Code rating of 10 amperes, 250 volts.



No. 7855 C-H Motor Attachment Plug.

The No. 7850 cord connector is 1-in. in diam., the caps being a trifle wider, and has a total length of only 2 ins. The knurled finish of the caps, with the lines converging towards the apexes, gives the connector a small, symmetrical and attractive appearance. The caps are sufficiently long to completely conceal the ends of the cord that are covered by binding, so only the smooth and regular covering

No. 7850 C-H Cord Connector.

of the cord is visible where it enters the caps.

The removable cap is made of molded "Thermoplax" insulation to which are riveted two parallel contact blades by means of two threaded brass inserts molded into the cap. Each insert is spun over the base of one of the blades, which forms a terminal plate, thereby holding the parts firm. Terminal screws fit into each of the two threaded inserts. The terminal plates are separated by a ridge of the molded material, which also reinforces the cap and reduces any possibility of breakage. Reinforcement is further given by the smooth rings around both the base and apex of the cap. The cord is entered through the eye of the cap and each of the two conductors brought through a hole at the base of one of the blades. The conductor makes a right angle bend over the terminal plate, which acts as a strain relief, and is clamped under the binding screw. This construction prevents the binding screw taking all the strain, so pulling and jerking on the cord do not tend to loosen the screw.

The body of the cord connector is also made of molded "Thermoplax," to which are riveted bronze clips for making contact with the blades in the cap. The removal of two screws from the base allows the intermediate piece to be separated from the cap, exposing the terminal screws and bronze clips.

A motor attachment plug of a similar type, known as No. 7855, and having the same current and voltage rating, is shown in one of the illustrations. The base and body both have a diameter of 1-inch. Its small and attractive appearance makes it particularly desirable for use with small motor-operated utility devices in the home, office and restaurant.

New Thermostatic Switch for Electric Circuit.

The "Absolute" thermostatic contactor is a new device for making and breaking an electric circuit by means of temperature changes. To a double spiral of thermostatic metal an "Absolute" contactor tube is attached at the center in a horizontal position in such a manner that operation of heat or cold on the spiral serves to tilt the contactor tube one way or the other. The "Absolute" contactor tube consists of a glass tube, hermetically sealed, with central electrodes forming a gap near one end. The tube contains a certain quantity of mercury and an inert gas, the office of which is to prevent oxidation or combustion within the tube. When the tube is tilted downward slightly at the gap end the mercury runs downward and engages both tips of the electrodes, establishing the circuit. The quantity of mercury and the design of the tube determine the variation of temperature at which it will operate to make or break the circuit. These thermostatic tubes are made to operate on temperature variations ranging from 0.5 deg. F. upward. "Absolute" contactor tubes are now in use in the plants of the Goodyear Tire & Rubber Co., for safety switches, and by the Reliance Weighing Machine Co. in connection with automatic weighing devices.

The following advantages in using this device are given by the manufacturer, the Absolute Contactor Co., 127 North Dearborn street, Chicago: The

"Absolute" Thermostatic Contactor.

mercury, being a liquid, so adjusts itself to the electrodes as to establish maximum area of contact with high conductance. Due to the inert gas which fills the tube, no oxidation or combustion can result from the arc which is produced in making or breaking of contact. On this account no deterioration results. Being hermetically sealed the contactor remains unaffected and uncontaminated by atmospheric conditions, nor can the operation of the contactor in any way act upon the atmosphere, however charged with explosive matter the atmosphere may be. It needs no care to keep it fit, and it may always be depended upon to form a perfect contact, no matter how often or seldom used. Its operation is equally positive, whether for a large variation or for a temperature change of 0.5 deg. The weight of the mercury is utilized to make the switching operation instantaneous. It has a range of from —38 to 300 deg. F. Anyone may adjust it to operate at a required temperature. It has no bearings, requires no oil and has no levers or springs. It will take care of high-current values and will itself control a motor of considerable power before a relay becomes necessary. The "Absolute" thermostatic switch is particularly adapted for use in connection with refrigerating plants, large and small cold rooms, incubators and brooders, greenhouses and seed germinators, dry-kilns, heating of buildings, automatic sprinkler systems, fire alarms, etc.

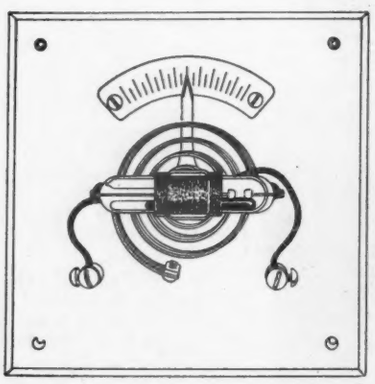


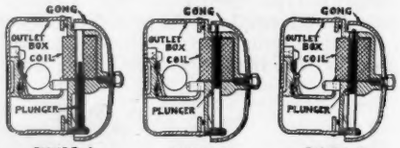
Diagram of Contactor Mechanism.

Bells with Clear and Distinct Tones.

Due to the improvement in the management and organization of industrial plants during the last few years the maintenance of both signal and emergency alarm systems has become essential, with the result that coded signals are commonly used for rapid communication with scattered men or distant individuals. A bell is frequently the signal transmitting medium, but if its tone is not clear crashing noises and dull thuds may prevent its sound being heard.

With these disadvantages in mind, the Klaxon Co., Newark, N. J., has developed the "Klaxon" singlestroke bells, which give a true ringing sound, clear, full-toned, pleasant yet penetrating. They have no gears, levers and complicated mechanism, but are of simple design and rugged construction and have only a single moving part—the plunger—which is made of condensite, brass tipped and specially treated to prevent corrosion.

The operation of the "Klaxon" single-stroke bell is simple. The entire mechanism consists of a solenoid,



Diagrams Showing Operation of Plunger.

or coil, with a vertical iron core plunger, which when the coil is magnetized by a flow of electricity through it, is drawn up with considerable force. Ordinarily the plunger would come to rest centrally within the coil, but momentum carries it up beyond, with the result that its upper end strikes the gong a single clear-cut blow, setting the bell in instant and complete vibration. Since the plunger is promptly withdrawn, due to the rebound from the blow and the action of gravity and the magnetic pull of the coil, the vibration continues unhampered and the clear penetrating note continues to be heard.

These bells are furnished for operation on a-c. and d-c. circuits of practically any voltage and have been approved by the National Board of Fire Underwriters. The 4-in. size is made in three types, differing only in tone—silvery, soft ringing and musical. There are also 6, 8, 10 and 12-in. sizes for greater sound volume, and all have been subjected in their development to tests equivalent to the wear and tear of many years of actual service. tear resulting from many years of actual service.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Power Construction & Supply Co., Norwich, Conn., has filed notice of dissolution under state laws.

Corliss Carbon Co., Bradford, Pa., manufacturer of Corliss brushes, has increased its capital stock from $500,000 to $1,000,000.

Epping-Carpenter Pump Co., 43d street and Alleghany Valley railroad, Pittsburgh, has filed notice of dissolution under state laws.

Slotko Lighting Fixture Co., Philadelphia, has recently opened a new establishment at 55 North Seventh street. L. P. Harris is manager.

Driver-Harris Co., Harrison, N. J., manufacturer of electrical wires and other equipment, has filed notice of increase in its capital stock from $3,000,000 to $4,500,000.

Thomas & Holben Electrical Repair Co., 1035 Hamilton street, Allentown, Pa., recently incorporated, will operate a plant at address noted for electrical work of all kinds. W. F. Holben is president.

Pittsburgh Electrical & Machine Co., Barker place, Pittsburgh, has acquired the factory of the Pittsburgh Trunk Manufacturing Co., on Fontella street, Northside, for a consideration of about $15,000, and will use the property as a new works.

Western Electric Co. will supply practically all of the lighting apparatus to be used in the new 24-story building of the Cunard Steamship Co. at 25 Broadway, New York City. It has completed arrangements to supply 4500 200-watt size "Duplexalites," which will be installed throughout the entire structure by May 1 by the Lord Electric Co., the electrical contractor.

Hoover Suction Sweeper Co., North Canton, O., sounds a note of optimism in a recent issue of its house-organ, known as the "Point Sheet," the following statements appearing therein: "Hoover Dealers Report Splendid Business from Spring Drives"; "Thousands of Hoover Dealers Say 'Business is Good,'" and "From North, East, South and West Come Reports of Returning Prosperity."

Domestic Electric Co., Cleveland, specialist in the production of small motors for use on household appliances, has published for the use of electrical dealers and contractors four illustrated pamphlets which cover the mechanical and electrical characteristics of fractional horsepower motors. These pamphlets have been prepared with the idea in mind of acquainting the dealer and salesman of washing machines, vacuum cleaners, dishwashers, etc., with the advantages of the split phase induction, the series wound and the d-c. motor. The pamphlets are illustrated with photographs and torque charts and are written in a simple, nontechnical style that adapts them for study by men who desire a general sales knowledge of the various motors operating the appliances they handle.

Lindstrom-Anderson Electric Corp., Jamestown, N. Y., has filed notice of dissolution under state laws.

Dynamic Engineering & Machine Co., Brooklyn, N. Y., has filed notice of dissolution under state laws.

Sun Electric Conduit & Manufacturing Co., New York City, has leased property at 10-12 Reade street for local headquarters.

Electrical Industries Manufacturing Co., 328 West 41st street, New York City, has filed notice of increase in its capital stock from $40,000 to $100,000.

Conduit-Miller Co., 440 South Warren street, Syracuse, N. Y., has filed notice of change of name to the M. H. Salmon Electric Co.

Buffalo Chandelier Corp., Buffalo, N. Y., manufacturer of electric lighting fixtures, etc., has filed notice of increase in its capital stock from $50,000 to $125,000.

Bryant Electric Co., Bridgeport, Conn., has leased space in the building at Madison avenue and 43d street, New York City, for local headquarters.

American Engineering Co., Philadelphia, maker of the Taylor stoker, has established a midwestern service station at 1722 West Lafayette boulevard, Detroit. It is announced that a complete stock of parts for all sizes and types of Taylor stokers is carried and prompt shipments can be made.

Marconi Wireless Telegraph Co., Woolworth building, New York City, has entered into an agreement with the government of Peru for the operation of the postal telegraph and wireless service in that country for a period of 25 yrs., effective May 1. Improvements and extensions will be made in the system to cost in excess of $500,000.

Crescent Electric Co., Inc., Mountain Grove, Mo., has announced that it has sold the "Acme" molded weatherproof socket department of its business to J. H. Parker & Son, Inc., Parkersburg, W. Va. The Crescent Electric Co. will continue in business, devoting its efforts to the manufacture of socket screw shells, fuse shells, fuse plug caps, fuse ferrules and other special parts for electrical manufacturers.

Western Electric Co., 110 William street, New York City, has issued a set of manuals which will govern most of its local dealer advertising during the current year. The company advises that it has attempted in this literature to produce advertising media of a more attractive nature than that used in the past. Suggestions for fan window display are distinctly novel and eye-compelling, and are designed to make a hit with the dealers and the passerby.

Lehigh Electric Co., Allentown, Pa., has removed to its new establishment at 28 North Sixth street, where increased facilities are provided.

Royal Metal Lighting Fixture Co., 425 West Broadway, New York City, has filed notice of increase in its capital stock from $15,000 to $30,000.

Star Chandelier Co., 33 Bleecker street, New York City, is now occupying additional space at this address because of the increase in business during the past few months.

Electric Outlet Co., 119 W. 40th street, New York City, has secured an interest in the M. S. Wright Co., Worcester, Mass., for the manufacture of vacuum cleaners and player-piano actions. In the future a portion of the works will be devoted to the manufacture of electrical specialties as produced by the Electric Outlet Co.

Builders Iron Foundry, 9 Codding street, Providence, R. I., makers of the Venturi meter, have recently let the contract for the erection of an additional plant at Kinsley and Sims avenues, Providence. With the two plants in operation the various branches of the business will be segregated.

Radiant Fixture Co., 33 Bleecker street, New York City, has prepared for distribution to jobbers and dealers its illustrated catalog No. 10A, showing some staple numbers of "Radiant" fixtures. The catalog consists of 28 pages, and describes electrical fixtures made of solid brass in standard finishes and sufficient variety of style as to permit a complete set of house fixtures to be selected.

Conveyors Corp. of America, Chicago, manufacturer of coal and ash-handling equipment, etc., has announced the appointment of Robert B. M. Wilson as sales engineer of the Chicago district. With him will be associated E. M. Wolfe as assistant. Headquarters will be maintained in the corporation's main office at 326 West Madison street. Mr. Wilson has had a well-rounded experience in industrial engineering, which included 10 years in railroad construction and maintenance work. Since 1912 he has been an associate member of the American Society of Civil Engineers. Since the war he has been a sales engineer with the Conveyors Corporation, being located in Indiana sales territory. Mr. Wolfe has been connected with the firm for several years in a sales capacity and has had considerable experience in conveyor engineering, having aided in the designing of the conveying equipment of some of the foremost plants in the Chicago district.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

HERBERT C. HOOVER, secretary of commerce, has resigned as president of the American Engineers' Council of the Federated American Engineers' Societies.

WILLIAM H. CULVER, a former Chicago newspaper man, has been appointed secretary to Col. Frank L. Smith of Dwight, Ill., chairman of the Illinois Public Utilities Commission.

GEORGE L. HOXIE has become connected with the Southern California Edison Co., Los Angeles, Cal., as a research engineer to make investigations of power resources and their conservation and most effective utilization.

WILLIAM S. KLINE, who has been connected with the Commonwealth Edison Co. for the past 19 years, has resigned to become vice-president of the Lake Shore Trust and Savings Bank, North Michigan avenue and East Ohio street, Chicago.

W. J. BROWN has been appointed superintendent of district "O" of the Public Service Co. of Northern Illinois, Chicago, succeeding W. J. MacPherson, who has been made chairman of the Central Committee on Co-operation of the company.

WILLIAM E. CONRAD has been appointed superintendent of buildings, supplies and motor equipment of the Illinois Bell Telephone Co., Chicago. Since January, 1920, he has been office manager for W. R. Abbott, vice-president and general manager.

ARTHUR L. LINN, JR., formerly comptroller, treasurer and assistant secretary of the United Gas & Electric Corp. of Connecticut, 61 Broadway, New York City, has been elected vice-president of the company to succeed Tracy A. Johnson, who resigned a few months ago.

FRANCIS E. DONOHUE, JR., son of F. E. Donohue of the Safety Insulated Wire & Cable Co., New York City, recently returned from overseas, having completed his naval service. He is now with the Westinghouse Lamp Co. in the commercial engineering department.

F. E. GOODNOW, formerly engineer of electrical design of the Public Service Co. of Northern Illinois, has been appointed electrical engineer of the company, with headquarters in the general offices at 72 West Adams street, Chicago. He has been in the employ of the company for over 10 years.

EDWARD J. DOYLE recently celebrated the 25th anniversary of his connection with the Commonwealth Edison Co., Chicago. He started in as an office boy with the old Chicago Edison Co. back in 1896, being later advanced to the position of private secretary to Mr. Insull. In 1913 he was appointed assistant secretary and assistant treasurer of the Commonwealth Edison Co., and a year later became secretary and treasurer.

O. FREDERICK ROST, general manager of the Newark Electrical Supply Co., Newark, N. J., and president of the Beechwood Property Owners' Association, acted as toastmaster at the recent annual dinner of the organization held at the Robert Treat Hotel, Newark, N. J., in celebration of the sixth anniversary of the establishment of the now thriving town of Beechwood, N. J.

COL. IRA L. REEVES, who was formerly connected with the engineering staff of The Dorr Co., recently organized the Ira L. Reeves Co., 450 Fourth avenue, New York City, and the Reeves Domestic Utilities Co., 50 East 42d street,

Col. I. L. Reeves.

New York City, to engage in industrial engineering work and manufacture various domestic utility devices. Col. Reeves is a veteran of many wars and has risen through all the ranks from private to colonel of infantry through meritorious service. Some years ago he was engaged in the development of several industrial and railway enterprises, among them the Muskogee Electric Traction Co., of which he was president and general manager. In 1915 he was made president of the Norwich University of Northfield, Vt. He served overseas in various capacities in the world war and on his return to this country was made a member of the War Credits Board and of the War Department Claims Board, being later placed in charge of all organization work and the personnel pertaining to settlement of war department claims. In March, 1920, Col. Reeves resigned to join the engineering staff of The Dorr Co., where he remained until he organized the companies bearing his name.

WASHINGTON DEVEREUX, chief of the electrical department of the Philadelphia Fire Underwriter's Association, left recently for Mount Clemens, Mich., for treatment and complete relaxation from all business. He will probably be away for a month or 6 weeks. Prior to Mr. Devereux' departure, Robert M. Nesbitt, one of the electrical inspectors of the Philadelphia Fire Underwriters' Association, was appointed assistant chief of the electrical department. Mr. Nesbitt's appointment was made after due consideration of his length of service in the electrical field and his close application and study of problems on electrical matters.

DOUGLAS WOOD, formerly a district representative for the Bryan-Marsh Division at Chicago for the National Lamp Works of General Electric Co., has been promoted and is now manager of the Colonial Electric Division, National Lamp Works of General Electric Co., at Warren, O. He replaces A. E. Williams, who resigned April 1 as manager of the Colonial division. Mr. Wood has been a member of the Bryan-Marsh Division at Chicago since 1913. He enlisted in the army in April, 1917, as a private and was discharged from the service in the spring of 1919 as a major, after having seen some 20 months service overseas.

E. DONALD TOLLES, for the past 4 yrs. secretary of the Atlantic Division of the Electrical Supply Jobbers' Association, has recently been designated by the executive committee of that organization as its special representative. His activities will include putting into operation the recommendations adopted by the Association and general work with manufacturers along lines which will permit the jobbers to more economically distribute electrical merchandise. By reason of his intimate knowledge of the jobber's problems and on account of his business and legal training, Mr. Tolles is particularly fitted for these new duties to which he has been appointed. He continues as the Atlantic Division secretary with offices at 52 Broadway, New York City, until May 1, and thereafter at 165 Broadway in the same city.

OBITUARY.

HARRY PAULITZ, who was connected with the customers' service and repair department of the Commonwealth Edison Co., Chicago, died recently. He had been in the service of the company since 1895.

FREDERICK P. RUGEE, formerly secretary of the Nordberg Manufacturing Co., Milwaukee, manufacturer of engines, died April 4 at his home in Hollywood, Cal., at the age of 49 yrs. He retired from active business about 4 yrs. ago.

HENRY K. PORTER, president of the H. K. Porter Co., Pittsburgh, manufacturer of steam and compressed air, mine and industrial locomotives, died April 10 at his residence in Washington, D. C., in his 81st year. He was one of the original trustees of the Carnegie School of Technology.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Lincoln, Me.—The new worsted mill of the Lincoln Worsted Co., recently organized, will be electrically operated, and electric motors, controlling devices and other equipment for this service will be installed. The new plant is estimated to cost in excess of $75,000. Alexander Davidson is president. The company is capitalized at $600,000.

Waterville, Me.—Considerable electrical equipment will be installed in the additions to be constructed to the plant of the Keyes Fibre Co., College avenue, to consist of a 2-story pumping plant and machine works, 45 by 95 ft., 1-story pulp department, 40 by 150 ft., and 1-story dryer works, 90 by 140 ft.

Boston, Mass.—Under a plan of reorganization, the Suburban Electric Securities Co. has taken over the properties of the Boston Suburban Electric Companies, and operations in the future will be conducted by the holding company.

Brockton, Mass.—The Edison Electric Illuminating Co., of Brockton, operating at Brockton, Whitman, Avon, East and West Bridgewater, and vicinity, has arranged for a capital stock issue. The company is operated by Stone & Webster, 147 Milk street, Boston.

Hartford, Conn.—The city officials are considering the question of laying the wires underground. Address John J. McIntyre, president of the Fire Board.

Southington, Conn. — Considerable electrical equipment will be installed in the additions to be constructed at the plant of the Peck, Stow & Wilcox Co., manufacturer of hardware specialties, to consist of three buildings, a 1-story hardening department, 67 by 180 ft., to be equipped with an electric traveling crane; 1-story forge shop, 57 by 100 ft.; and 2-story grinding works, 56 by 156 ft. Pierce & Hutton, Southington, are engineers.

Albany, N. Y.—Swetzer & Bainbridge, Inc., Tivoli street, has had plans prepared for the erection of a 1-story power house at its local works.

Brooklyn, N. Y.—Considerable electrical and mechanical equipment will be installed in the 3-story refrigerating plant, 131 by 135 ft., to be erected by the Brooklyn Retail Butchers' Corp., 3285 Fulton street, on Atlantic avenue near South Ellicott place. Plans are being prepared.

Brooklyn, N. Y.—The Brooklyn Edison Co., 360 Pearl street, has made application to the Board of Standards and Appeals for permission to build an addition to its 2-story electric transformer station at 374 Sumpter street.

Geneva, N. Y.—Electric motors, refrigerating machinery and other mechanical equipment will be installed in the 3-story cold storage plant, 190 by 200 ft., to be constructed by the Geneva Preserving Co., 55 North street, at a cost estimated at $70,000.

Ithaca, N. Y.—The Tompkins County Power Corp. has been incorporated with a capital of $20,000 to install and operate an electric light and power system in certain sections of Tompkins county. The incorporators are W. E. Towner, E. F. English and H. H. Brown, Ithaca.

New York, N. Y.—The New York Edison Co. has secured the contract for furnishing electric light and power for the new Straus building, now nearing completion, located at 46th street and Fifth avenue. The installation will comprise about 7000 lamps and 190 hp. for the operation of elevators, pumps and other mechanical equipment.

Atlantic City, N. J.—The Atlantic City Electric Co. has made application to the Board of Public Utility Commissioners for permission to issue bonds for $46,000, to be used in connection with general operations.

Cape May, N. J.—With bids closing on April 5, the Board of City Commissioners has failed to receive any bids for furnishing light and power service to the city, dating from Aug. 1, next. Service at the present time is being supplied by the Cape May Light & Power Co.

Gloucester, N. J.—The City Council is having plans prepared for the construction of a waterworks system to cost about $170,000. The present plant will be completely electrified; four new pumps will be installed, two high pressure type, and two low pressure, and a filtration plant constructed.

Jersey City, N. J.—The Public Service Corp., Newark, N. J., has filed plans for the erection of a machine shop on St. Paul's avenue, near Duffield avenue, to cost about $17,500, and for a 1-story compressor plant at the same location, to cost $32,000, both structures to be used by the Public Service Gas Co.

Morristown, N. J.—The Board of Public Utility Commissioners has granted the Morris & Somerset Electric Co., 20 South street, permission to issue stock for $150,000, about $50,000 of which will be used for proposed extensions and betterments to plant and system, and $75,000 for working capital.

Newark, N. J.—Electrical and mechanical equipment will be installed at the plant of the Mountain Ice Co., 103-9 Newark street, in connection with extensions and improvements to be made at the plant at a cost of $25,000.

Pitman, N. J.—The Borough Council is having plans prepared for a new electrically operating pumping plant to be used in connection with the waterworks system. The plant will cost about $50,000. Remington & Vosbury, Sixth and Market streets, Camden, N. J., are engineers.

South Amboy, N. J.—In accordance with an agreement made with the Common Council, the Monmouth Lighting Co. is planning the installation of new electric lights in different parts of the city.

Trenton, N. J.—The City Commission has rejected all bids received for the lighting of upper Stacy Park, and will re-advertise for figures. Commissioner Fell is in charge.

Allentown, Pa.—The Pennsylvania Power & Light Co. has plans under way for the erection of a hydroelectric power plant in the vicinity of Sunbury. Arrangements have been made with the Pennsylvania railroad to use a dam owned by the company, formerly the property of the Pennsylvania Coal Co., on the Susquehanna river, at a point known as the Lock House. The proposed power plant, with transmission lines to connect with the present system, is estimated to cost $3,000,000. The company has recently arranged for a bond issue of $8,000,000. It is operated by the Electric Bond & Share Co., 71 Broadway, New York City.

Bakerstown, Pa.—The Pittsburgh Cut Flower Co., Seventh avenue, has awarded a contract to the George Schenk Co., Butler, Pa., for the erection of a power house at its plant at Bakerstown, 1-story, 42 by 75 ft., to cost about $50,000.

Carlisle, Pa.—The chamber of commerce has inaugurated a movement for a new street-lighting system. Tentative plans are under way for the installation of ornamental street lamps on the main thoroughfares. The City council is also interested in the proposition.

East Berlin, Pa.—The Dillsburg Electric Light & Power Co. has acquired the Abblin Electric Co., formed a few months ago to furnish service to East Berlin and vicinity. The purchasing company has agreed to construct a transmission line from Dillsburg and Abbotstown to this section for local service. Construction of the line, which will be about 12 mi. long, will be commenced at an early date.

Middleburg, Pa.—The Middleburg Light, Heat & Power Co. has filed notice of increase in its capital stock from $10,000 to $50,000.

Philadelphia, Pa.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., has awarded a contract to the George Construction Co., 407 Stock Exchange building, for

the installation of a lighting system at the local navy yard.

Philadelphia, Pa.—The Department of Public Works is having plans prepared for the erection of a motor building and switchboard department at Lycoming and O streets. Bids will be taken at once.

Pittsburgh, Pa.—The Duquesne Light Co. has perfected plans for taking over the property and business of the Diamond Light & Power Co., including franchises. The system will be operated in the future with direct connection from the Duquesne company lines.

Pittsburgh, Pa.—The Oliver Iron & Steel Co., Tenth and Muriel streets, has taken bids for the construction of a 1-story power house at its plant on Carson avenue, 40 by 85 ft., to cost about $42,000.

St. Clair, Pa.—The Scranton Electric Co. has tendered a proposition to the Borough Council for the municipal electric-lighting plant now used for local service, with terms of agreement covering the supply of electric light and power to the municipality in the future. The Eastern Pennsylvania Light, Heat & Power Co. has also made an offer for the plant under similar conditions. Citizens are opposed to the change, it is said.

Steelton, Pa.—The Common Council has granted permission to the water board to electrify the pumping plant used for the waterworks system. New electrical and other equipment will be installed.

Williamsport, Pa.—The W. D. Byron & Sons Co. has perfected plans for the installation of new equipment at the power house at its leather tannery.

Baltimore, Md.—The Public Service Commission has approved the sale by the United Railways & Electric Co. of its power plant on Pratt street to the Consolidated Electric Railway, Light & Power Co.

Baltimore, Md.—The City Electric Commission has awarded contracts to the Western Electric Co., 425 East Oliver street, for vitrified conduit to be used in connection with a new underground district, and to the Fiber Conduit Co., Orangeburg, N. Y., for fiber conduit for the system. The total contracts are said to aggregate $1,200,000.

Baltimore, Md.—Considerable electrical equipment will be installed in the steel plant to be erected on a local site in the Curtis Bay section by the Maryland Steel Rolling Co., Fidelity building, recently organized with a capital of $200,000. The proposed plant is estimated to cost close to $100,000; it will specialize in the production of small iron and steel bars. J. G. Miller is president.

Baltimore, Md.—The Union Memorial Hospital is completing plans for a power plant to be erected in connection with its proposed new hospital building at 33d and Berkley streets, estimated to cost $1,000,000. A. R. Riggs, Equitable building, is director. Charles L. Reeder, 916 North Charles street, is engineer.

Baltimore, Md—The Department of Lamps and Lighting is planning the installation of a new arc light street-lighting system on Gay street, from Aisquith street to Broadway. John J. Hanson is superintendent.

Baltimore, Md.—During the coming year, the Chesapeake & Potomac Telephone Co. will expend $3,500,000 for new construction, including extensions, improvements, etc., to lines and exchange plants. The exchange additions will be built at a cost of about $260,000, with equipment to be installed estimated to cost $150,000. Other electrical equipment to be installed in present exchanges, is estimated to cost $100,000. About $250,000 will be expended for new conduit construction and underground lines.

Baltimore, Md.—The City Electric Commission, Charles F. Goob, engineer, has refused the request of the United Railways & Electric Co. to pay a duct rental for space in the municipal conduits, in lieu of removing of its feed wires in certain sections of the city. The commission has insisted on the removal of the lines, in accordance with previous agreement, and has served notice that a fine of $50 a day will be imposed for every pole carrying wires after the expiration of the notice, dated March 9 last, to place the wires underground. The United Company has submitted a tentative proposal for the removal of the overhead lines, covering an expenditure of $100,000 in 1921, a like amount in 1922, and $50,000 in 1923.

Hagerstown, Md.—The Baltimore & Ohio Railroad Co. is said to be planning the rebuilding of its local pumping plant, destroyed by fire on April 6.

Chatham, Va.—The Chatham Light & Power Co. is planning the installation of new equipment at its power plant to double the present capacity.

Edinboro, Va.—The State Normal School has plans under way for the erection of a power house at the institution to cost about $50,000. Cody, Hicks & Davidson, Ariol building, Erie, Pa., are architects and engineers.

Norfolk, Va.—The Automatic Light & Power Co., recently incorporated with a capital of $24,000, will operate a local light and power system. V. K. Cullen is president.

Quantico, Va.—The Bureau of Yards and Docks, Navy Department, Washington, D. C., has completed plans for the installation of a new light and power system at the local property of the department.

Huntington, W. Va.—The Consolidated Light, Heat & Power Co. is arranging for an increase in its capital stock from $530,000 to $865,000 for proposed extensions, improvements, etc. Walter W. Perkins is secretary.

Hamilton, N. C.—The Common Council is planning a bond issue of $10,000 for an electric lighting system. D. G. Matthews is town clerk.

Hickory, N. C.—The United Mills Co. has received permission from the Federal Water Power Commission to build a hydroelectric power plant at Harpers' creek, Caldwell county, to be used in connection with its textile mills.

Dania, Fla.—The Broward Utilities Co. has been incorporated with a capital of $25,000. Address W. C. Kreickenhaus, president.

Deland, Fla.—The Deland Electric Light, Power & Ice Co. is planning the installation of new machinery at its power plant for increased output. The work will include a new turbine, water-tube boilers, condensers, etc.

Fort Pierce, Fla.—At a special election, citizens have approved a bond issue of $60,000 for extensions and improvements in the electric light and power plant and system.

Safety Harbor, Fla.—The Borough Council is planning a bond issue of $10,000 for an electric-lighting plant.

NORTH CENTRAL STATES.

Norwalk, O.—The City will spend an additional $30,000 for equipment for its municipal power plant. Two new boilers and a high-tension circuit are to be installed. Address the mayor.

Shelby, O.—Bids were received this week for building a high-tension line from the tower of the Ohio Light & Power Co. on Vernon road north to West Main street, thence east on Main street to Broadway, thence north on Broadway to the plant of the Shelby Metal Products Co. Address George Williams, clerk of the board of trustees of public affairs.

Wapakoneta, O.—Plans have been prepared by Froelich & Emery, engineers, 403 Second National Bank building, Toledo, O., for the rebuilding of the municipal lighting plant. Address Harry Nagel, superintendent.

Holland, Mich.—A meeting will be held shortly by the merchants along Eighth and River streets to discuss the installation of boulevard lamps. Address Mayor Stephan.

Mt. Clemens, Mich.—Plans have been prepared for the erection of a $60,000 electric substation for the Detroit Edison Co. Address Alex Dow, president, David Whitney building, Detroit.

Traverse City, Mich.—The City Council will employ an electrical engineer to prepare estimates for a hydroelectric plant. Address L. Swanton, mayor.

Newcastle (Liberty Township) Ind.—Plans have been prepared by Werking & Son, architects, Richmond, Ind., for the erection of a school building which will have running water and electric lights. A single plant will provide both the water power and the electricity.

Belleville, Ill.—The City Council has authorized Mayor P. K. Johnson to enter into a contract with three public utilities for the removal of poles and overhead wires on East Main street, from the public square to Charles street.

Freeburg, Ill.—An election was held April 19 to vote on the question of issuing $25,000 in bonds for the reconstruction of the electric light plant.

Springfield, Ill.—The Springfield Gas & Electric Co. will purchase the ground on which its car barns, light plant and gas property stands. Address Arthur D. Mackie, general manager.

Springfield, Ill.—The Bloomington and Normal Railway & Light Co. has

applied for permission to issue $112,000 worth of bonds. Address W. B. McKinley, general manager, Champaign, Ill.

Springfield, Ill.—Following the approval of the assessment rolls for the downtown ornamental lighting system, the City Council will advertise for bids and the work of installing the lamps will be done as rapidly as possible. The amount of the assessment for the improvement is $61,000. Address city clerk.

Waukegan, Ill.—Plans are under way for the installation of an ornamental lighting system in the city. Address city clerk.

Janesville, Wis.—Installation of the 201 standards provided for in the city's 1921 program of ornamental lamp extensions will begin about May 1. Bids will be advertised at once. Address City Engineer C. V. Kerch.

Viroqua, Wis.—Officials of the Wisconsin-Minnesota Light & Power Co. conferred with the mayor recently in regard to the construction of a power line from Sparta to this city. The project is estimated to cost $90,000.

Wisconsin Rapids, Wis.—W. N. Albertson & Co., First Wisconsin National Bank building, Milwaukee, are constructing an electrical substation to take care of the east side of this city. It is necessary to rearrange the feeders, dividing the town, having the new substation take care of the power and lighting of the east side of the river, and the present station take care of the west side of the river.

Jackson, Minn.—The question of issuing $13,500 in bonds for the installation of a "white way" system here will be voted on at the coming city election. Address the mayor.

Independence, Mo.—The citizens will vote June 1 on the question of issuing bonds to the amount of $35,000 for extensions to the electric-lighting system.

Kansas City, Mo.—The Kansas City Power & Light Co. is completing plans for extensions and improvements in its electric generating plant to cost about $3,000,000. Of this amount, about $1,700,000 will be expended in the generating and auxiliary electrical departments, including considerable new machinery, and $1,300,000 in the steam department, the installation to include boilers, feed-water heaters, pumps, etc.

New Haven, Mo.—The Common Council is arranging for a bond issue of $14,000 for extensions in the electric-lighting system and waterworks department. Address the mayor.

St. Louis, Mo.—Electrical equipment will be installed in the addition to be erected at the plant of the Sieloff Packing Co., Natural Bridge avenue, to be used for icing service. The extension is estimated to cost about $25,000.

Delphos, Kan.—Bonds to the amount of $30,000 have been voted for municipal lighting purposes. Address the mayor.

Ellinwood, Kan.—Bonds to the amount of $40,000 have been voted to improve the light and water plant. Address the mayor.

SOUTH CENTRAL STATES.

Little Rock, Ark.—The Arkansas Light & Power Co. will double its plant capacity by constructing high-tension lines and installing new equipment. Address H. C. Couch, president, Arkadelphia, Ark.

Cherokee, Okla.—City Manager Bomford will supervise the erection of the high line from Jet and Nash. Two towns have voted bonds to erect an electric line to Cherokee, the plant here to furnish power for lighting purposes in the future.

Lawton, Okla.—The Lawton Railway & Lighting Co. plans an extension of its line from Fort Sill to Medicine Park, a distance of 9 mi., at an estimated cost of $300,000.

Nash, Okla.—Bonds have been voted to secure electric light facilities in connection with the neighboring town of Jet.

Paden, Okla.—The citizens have voted $8200 for improvements to the electric light plant.

Sand Springs, Okla.—The Sand Springs Home has applied to the Federal Power Commission for permission to construct a dam at Carrie Island in the Grand river for power purposes.

Paris, Tex.—The Southwestern Bell Telephone Co. will install from 12,000 to 15,000 ft. of new cable and rearrange its plant. The estimated cost of the project is $40,000. Address H. S. Atkinson, foreman.

WESTERN STATES.

Denver, Colo.—A bill introduced by Councilman Thomas F. Azpell, to establish 55 arc-lamps at various street intersections throughout the city, was passed recently.

Ouray, Colo.—Thomas P. Mitchell has applied to the Federal Power Commission for a license to erect a transmission line, 2 mi. long, across the Uncompahgre National Forest in Ouray county, Colorado, for the purpose of furnishing power to a mine.

Grangeville, Ida.—The Grangeville Electric Light & Power Co. has applied to the Federal Power Commission for a license to construct a dam, conduit and power house in the south fork of the Clearwater river for public utility purposes.

Bandon, Ore.—Preparations are being made for the installation of the proposed hydroelectric power plant at this place, which will develop 300 kw. The project calls for the installation of 16 mi. of pole line. The estimated cost is $110,000. Address Miller Engineering Co., 531 Burke building, Seattle, Wash.

Byron, Cal.—The city plans to install a street-lighting system which will consist of 50 lamps. Address the mayor.

Fresno, Cal.—The Park Commission has discussed plans for the improvement of Roeding park and voted to install electric lamps and concrete benches in the park before the opening of the summer season.

Fresno, Cal.—E. B. Walthall, 1860 Van Ness avenue, has applied to the Federal Power Commission for a preliminary permit to construct a low diversion dam at the junction of the middle and south forks of the Kings river; a 16-mi. tunnel to power house, dam and reservoir in Squaw valley; 8-mi. covered aqueduct to the power house on Kings river in Fresno county, California, for public utility purposes.

Hollywood, Cal.—Preliminary steps toward the carrying out of the $1,040,000 program of the Pacific Electric Co. for installing faster service to Hollywood, which includes a plan of tunneling from the Hill street station to Figueroa street, will be started at once by the California State Railroad Commission.

Los Angeles, Cal.—The Green River Power Co., Pacific Electric building, has applied to the Federal Power Commission for a preliminary permit covering a project to develop all the water power in Green river from a point near Green River, Wyo., to its junction with the Grand river in Utah, for public utility purposes.

Santa Cruz, Cal.—The matter of installing lamps on Short street, from Front street to the newly installed footbridge, has been referred to Commissioner Royse.

Petersburg, Alaska—The Town of Petersburg has applied to the Federal Power Commission for a license to construct a tunnel and pipe line 0.5 mi. from Crystal Lake to the power house near the Salt Lake arm of Wrangell Narrows on Mitkoff Island, 16 mi. from Petersburg, for public utility purposes.

PROPOSALS.

Washington, D. C.—A. L. Flint, general purchasing officer, Panama Canal, will receive bids up to April 28 for a quantity of electrical supplies for canal zone service, as set forth in Circular 1443.

Cincinnati, O.—Bids will be received May 9 for complete installation of an electric-lighting system in the 12th district public school building at Eighth and Melvin streets. Address clerk of the board of education, Denton building, Cincinnati.

Pullman, Wash.—Bids will be received shortly for the installation of a new boiler and generators for the heating system of the new gymnasium at the Washington State College, and for the extension of the heating tunnel system over the campus.

INCORPORATIONS.

New York, N. Y.—Parmount Lighting Fixture Corp. Capital, $30,000. To manufacture electric fixtures and other electrical products. Incorporators: H. A. Safion, M. Coringer and J. J. Gans, 302 Broadway.

Brooklyn, N. Y.—Greenfield Electric Supply Co. Capital, $25,000. To manufacture and deal in electrical specialties. Incorporators: A. L. Rush, S. Dampf and A. S. Greenfield, 995 Eastern parkway.

Jersey City, N. J.—Hydro-Electric Pyro Co. Capital, $200,000. To manufacture and deal in electrical appliances. Incorporators: Albert H. Frankfort, and Paul Andreae, 52 Warner avenue.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Finance Plans of National Conduit & Cable Co

The stockholders' protective committee of the National Conduit & Cable Co., 41 Park Row, New York City, has notified stockholders regarding plans for rehabilitation of the company's finances. The plans oppose the sale of any part of the company's plant, but recommend the sale of a new issue of 8% cumulative preferred stock to provide $1,200,000. This, however, will be adopted only in the event holders of first mortgage bonds fail to agree upon a reduction in the net quick assets from 100 to 50% and extension of the mortgage to 1931, against the present maturity in 1927. The mortgage states that at all times net quick assets must equal 100% of outstanding mortgage bonds.

Radio Corp. of America.

The condensed balance sheet of the Radio Corp. of America as of Dec. 31, 1920, follows: Assets—Cash and receivables, $881,507; merchandise inventories, $689,517; investment in Government and industrial bonds, $3,375,210; stocks of associated companies, $550,385; plants and equipment after depreciation, $8,901,675; deferred charges, $606,669; patents, good will, contracts and franchises, $10,107,982; total, $25,112,945. Liabilities—Preferred stock, $13,525,870; common stock, $9,611,392; current liabilities, $1,883,227; reserves, $92,456; total, $25,112,945.

Canadian Westinghouse Co., Ltd.

Net earnings of Canadian Westinghouse Co., Ltd., for year ended Dec. 31, 1920, were $916,080, equal to $14.70 a share, compared with $616,000, or $9.80 a share in 1919. Dividends paid during the year were $615,524 and balance transferred to profit and loss $300,555, bringing surplus up to $2,114,828. Current assets were $3,116,839 against $2,164,243 in 1919 and current liabilities $1,591,154 against $883,440, leaving working capitol of $1,525,685 against $1,280,803.

Lake Shore Electric Railway System.

	1921.	1920.
January gross	$ 214,777	$ 231,232
Net after taxes	19,817	51,386

Consumers Power Co.

Including operation of the Michigan Light Co.

	1921.	1920.
February gross	$1,233,403	$1,140,560
Net after taxes	486,420	357,547
Surplus after fixed charges	297,837	204,903
Balance after preferred dividends	229,383	140,474
12 mo. gross	14,363,260	11,900,344
Net after taxes	4,559,137	4,300,690
Surplus after fixed charges	2,371,899	2,614,601
Balance after preferred dividends	1,583,653	1,843,172

Great Western Power System.

	1921.	1920.
February gross	$ 601,936	$ 457,427
Net after taxes	392,467	259,281
Surplus after charges*	162,560	60,461
12 mo. gross	6,833,561	5,496,548
Net after taxes	3,949,141	3,093,522
Surplus after charges*	1,429,228	860,887

*Also after accrued dividends on California Electric Generating Co. preferred stock.

Earnings of Electric Storage Battery Co.

The Electric Storage Battery Co. has published its report for 1920, incorporating the earnings of the Willard Storage Battery Co., showing combined net income for the year, after inventory adjustments but before federal taxes, of $6,157,091. Federal taxes are estimated at $1,500,000, leaving net earnings equivalent to $23.31 a share on the outstanding capital stock of the Electric Storage Battery Co. The company's gross sales, less costs, amounted to $12,134,614, and operating expenses to $4,585,603. Other income was $621,631, inventory adjustments $2,013,551 and dividends $2,031,206, leaving a surplus of $4,125,885 for the year.

Utah Power & Light Co.

Including the Western Colorado Power Co.

	1921.	1920.
January gross	$ 654,751	$ 576,949
Net after taxes	342,797	274,442
Surplus after charges	210,358	145,545
Total income	353,329	284,025
12 Mo. gross	6,808,651	5,728,053
Net after taxes	3,199,756	2,788,071
Total income	3,349,106	2,902,108
Surplus after charges	1,638,914	1,238,741
Balance after preferred dividends	1,047,414	663,285

San Diego Consolidated Gas & Electric Co.

Year ended Feb. 28—	1921.	1920.
Gross earnings	$2,845,033	$2,272,904
Net earnings	867,843	793,804

Havana Electric Railway, Light & Power Co.

	1921.	1920.
January gross	$1,089,076	$ 883,118
Net earnings	450,896	446,063
Total income	457,161	452,115
Surplus after fixed charges	223,355	207,379

Cumberland County Power & Light Co.

	1921.	1920.
January gross	$ 281,055	$ 259,179
Net after taxes	109,004	91,330
Surplus after charges	52,921	35,865
12 mo. gross	3,135,883	2,812,057
Net after taxes	988,847	987,804
Surplus after charges	320,747	316,776

Commonwealth Power, Railway & Light Co. and Subsidiaries.

	1921.	1920.
February gross	$2,633,699	$2,476,027
Net after taxes	885,277	809,954
Surplus after fixed charges	272,177	258,695
Balance after preferred dividends	182,412	168,930
12 mo. gross	31,688,390	26,853,902
Net after taxes	9,039,222	9,148,964
Surplus after fixed charges	1,887,062	2,612,697
Balance after preferred dividends	809,882	1,535,517

Southern California Edison Co.

Month of February—	1921.	1920.
Gross earnings	$1,078,959.88	$ 860,163.26
Expenses and taxes	484,034.19	412,015.69
Net earnings	594,925.69	448,147.57
Fixed charges	271,791.49	248,104.54
Balance	323,134.20	200,043.03
12 mo. ended Feb. 28, 1921—		
Gross earnings	15,279,141.09	10,772,808.48
Expenses and taxes	6,490,704.77	4,788,855.30
Net earnings	8,788,436.32	5,983,953.18
Fixed charges	3,225,596.02	3,073,209.73
Balance	5,562,840.30	2,910,743.45

Western Union Telegraph Co.

Report for the quarter ended March 31 (March estimated) shows gross revenue of $26,430,000, against $29,340,057 in the corresponding period of 1920, and net income after interest on bonded debt, $1,798,500, against $3,566,730 in the same period a year ago.

Dividends.

	Term.	Rate.	Payable.
El. Bond & Sh. Co., com.	Q	2.5%	Apr. 15
El. Bond & Sh. Co., pfd.	Q	1.5%	May 2
Ft. Worth Pr. & Lt., pfd.	Q	1.75%	May 2
Hav. E. R., L. & P., com.	SA	$3	May 16
Hav. E. R., L. & P., pfd.	SA	$3	May 16
Idaho Power, pfd.	Q	1.75%	May 1
Sierra Pac. El., pfd.	Q	$1.50	May 2

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

	Div. rate. Per cent.	Bid Apr. 11.	Bid Apr. 18.
Public Utilities—			
Adirondack Electric Power of Glenns Falls, common	6	10	11
Adirondack Electric Power of Glenns Falls, preferred	6	71	72
American Gas & Electric of New York, common	..	101	101
American Gas & Electric of New York, preferred	6	37	38
American Light & Traction of New York, common	..	92	87
American Light & Traction of New York, preferred	6	82	82
American Power & Light of New York, common	4	51	52
American Power & Light of New York, preferred	6	71	71
American Public Utilities of Grand Rapids, common	..	7	7½
American Public Utilities of Grand Rapids, preferred	7	17	18
American Telephone & Telegraph of New York	..	105	106
American Water Works & Elec. of New York, common	..	4	4
American Water Works & Elec. of New York, particip	7	7½	8
American Water Works & Elec. of New York, 1st preferred	..	46	47
Appalachian Power, common	..	3	3
Appalachian Power, preferred	7	24	24
Cities Service of New York, common	+extra	234	235
Cities Service of New York, preferred	6	66½	67
Commonwealth Edison of Chicago	8	108	108½
Comm. Power, Railway & Light of Jackson, common	..	11	10
Comm. Power, Railway & Light of Jackson, preferred	6	31	31
Federal Light & Traction of New York, common	..	6½	7
Federal Light & Traction of New York, preferred	..	42	43
Northern States Power of Chicago, common	..	47	47
Northern States Power of Chicago, preferred	ex.div.7	79	80
Pacific Gas & Electric of San Francisco, common	..	46	48
Public Service of Northern Illinois, Chicago, common	7	75	77
Public Service of Northern Illinois, Chicago, preferred	6	82	81
Standard Gas & Electric of Chicago, common	..	11	11
Standard Gas & Electric of Chicago, preferred	8	35	34½
Tennessee Railway, Light & Power of Chattanooga, common	..	1	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	5½	5
Western Power of San Francisco, common	..	24	24
Western Union Telegraph of New York	..	91	90
Industrials—			
Electric Storage Battery of Philadelphia, common	4	97	97
General Electric of Schenectady	8	132	137
Westinghouse Electric & Mfg. of Pittsburgh, common	7	47½	48